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UNDERSTANDING IMPULSIVITY AND  
RELATED COGNITIVE STYLES IN  
INMATE STUDENTS

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February, 1981

Research report submitted to the Ministry of the  
Solicitor General of Canada according to contract  
agreement 80/81-HQ-144. The views expressed in  
this report are those of the investigators and do  
not necessarily reflect those of the Ministry.



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Submitted to Professors Edward Berlin, Jim Russell, Lars  
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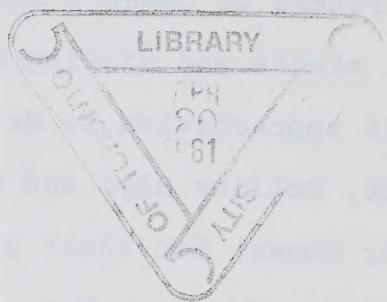
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### Abstract

Students' ability to learn in an effective manner is influenced to a great extent by the ways in which they perceive, encode and act upon information presented in the educational context. Such processes are known as cognitive styles and include, among others, reflection-impulsivity, field dependence-independence, conceptual level, and attentional focus. There are many ways to accommodate students with dysfunctional styles so that learning effectiveness will not be impaired. However, before such programs can be implemented, it is necessary for the educator to first identify those students whose learning characteristics require specialized teaching approaches. This pilot study reports on efforts to establish valid indicators of the above cognitive styles in a sample of male and female inmate students. The students were videotaped in regular classroom situations and subsequently interviewed about their in-class behaviour. The following four methods were used to assess the functioning of students with regard to the above cognitive styles; (1) traditional psychometric tests, (2) judges' ratings of the videotaped students, (3) trained observer's ratings of the videotaped students, and (4) teachers' ratings of the students based on classroom observation. While the students on average did not differ from non-inmate students in terms of learning characteristics as measured by psychometric tests, there were a number of significant associations between various assessment

methods within the group. Of particular importance was the demonstration of ecological validity for reflection-impulsivity. Students identified as relatively impulsive by the psychometric test were also observed to behave in cognitively impulsive ways by teachers, judges, and the observer. The other styles did not obtain ecological validity due to their strong association with the cognitive style of reflection-impulsivity. These results suggest that exclusive reliance on psychometric tests for diagnostic and remedial purposes would be of questionable utility. Carefully chosen psychometric tests in conjunction with observational measures of student performance in vivo would seem appropriate. Program recommendations are suggested which would have the effect of both accommodating and modifying cognitive impulsivity.

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## INTRODUCTION

Persons who find themselves secured in prisons have had some aspect of their behaviour judged as sufficiently inappropriate to require segregation and a chance for rehabilitation. As a result, these persons carry with them the label of being somehow different from those on the outside. Understanding the nature of this difference has been the subject of considerable research in recent decades and is surely a prerequisite for planned, as opposed to chance, rehabilitation by corrections authorities. If the educator in the prison is to contribute to this process, he too must understand the nature of this difference, and particularly those differences which characterize the inmate student's ability to profit from instruction.

### Toward a theory of corrections instruction

The need to know how student characteristics or individual differences interact with instruction has been a recurrent theme in the educational psychology literature for nearly a century. The observation that teachers need to take into account the

obvious facts that their students learn at varying rates (NSSE, 1925) and in different ways (NSSE, 1962) has long been recognized. Yet, our understanding and attempts to further understand such differences have made little impact in the classroom. Suppes emphatically remarked nearly twenty years ago that the application of our knowledge of student characteristics "is the most important principle of learning as yet unaccepted in the day-to-day practice of subject-matter teaching in the classroom (1964, p.79)." His observation remains credible today. Cronback and Snow, whose recent work has had enormous impact on the research on individual differences, argue that the high failure rate among the working class and poor occurs not because their members lack preparation or motivation, but rather because particular school programs do not accommodate their characteristics (1977).

The need for a better understanding of individual differences among students becomes an explicit requirement in any attempt to define a generic theory of instruction, and a specific theory of corrections instruction. Glaser (1976) suggests that such theories are attainable and he outlines their requirements.

A theory must offer ways of:

1. Analyzing what is to be learned, e.g., the types of learning and sequences leading to competent performance.
2. Describing the initial state of the learner, e.g., those aptitudes, cognitive styles and prior experience which contribute to individual differences and learning effectiveness.

3. Identifying and describing the instructional conditions which foster the acquisition of competence, e.g. eliciting internal cognitive conditions and providing external conditions in the teaching environment appropriate to objectives.
4. Measuring the long and short-term effects of instruction, e.g. measures which are sensitive to changes in behaviour, the transfer of learning and one's increased capacity to learn.

Of central concern in this report is requirement 2 above which addresses the issue of individual differences, and by extension requirement 3 which addresses conditions. If effective learning is to take place, conditions must be present which provide a match for the unique characteristics of individual students. (For a thorough overview of this principle see Cronback and Snow, 1977; and Snow, et al., 1980.) And if a theory of corrections instruction is to be developed, surely one of its primary aims will be to understand those characteristics of the adult offender which affect his or her ability to learn. For research purposes the questions become: what are the individual differences among inmate students which make a difference in their learning; and can these differences be taken into account for the purpose of developing effective instruction? This exploratory study specifically addresses the first question and, on the basis of results obtained, will offer implications and directions for further research on the second question.

The need for such information has been recently expressed in the O.I.S.E. Review of Penitentiary Education and Training (Griffin, 1979):

Whatever the general situation may be regarding the preferences of adult learners, it is still important to seek answers to other questions regarding inmate students. The first question is to what degree do inmate students possess adult learning characteristics, and the second question is to what degree do their criminality and actual learning characteristics require specialized teaching approaches (p.61).

#### Learning - related characteristics of the prison inmate

Partial, but not immediately applicable, answers emerge from the OISE Review cited above. It is reported that about 53% of teachers and 81% of education administrators who were respondents in the study judged inmate students as having the same or superior general level of ability compared to non-inmates. However, when asked about the maturity of inmate students, about 8% of the teachers and 3% of the administrators observed that inmate students demonstrate the emotional and mental maturity of the non-inmate adult.

Describing inmate students as immature provides a first approximation of individual differences in broad strokes. However, a more definitive picture is required if one wishes to draw implications for special approaches to teaching. Descriptions of characteristics need to carry implication for prescription.

As suggested by the respondents in the O.I.S.E. Review, the assessment of individual differences in cognitive functioning must look beyond general ability levels. There is substantial empirical support for the view that inmates do not differ in general ability from non-inmates (Yochelson and Samenow, 1976; Feuerstein, 1972; Ward and Yeudall, 1980). Therefore, differences need to be explained in terms of some other facet of cognitive functioning. Cognitive style has been offered as a construct to fill this gap.

Cognitive styles help to explain variance in cognitive functioning not accounted for by general measures of ability or intelligence. They have been defined as the stable ways in which persons differ in perception and encoding information (Wittrock, 1978), as the degree of some manner rather than level of performance (Kagan, 1971), and as executive controls on cognitive functioning (Guilford, 1980).

The present study offers and will test the assumption that the cognitive style construct of reflection - impulsivity and associated styles offers a useful means for describing inmate students' characteristics. This particular style was chosen because impulsivity: a) is a common characteristic of the young and would be viewed as immaturity in the adult, b) is the subject of an extensive body of literature which includes attention to characteristics of the delinquent and adult criminal, and c) is observable as a cluster of behaviours which have obvious implications for effectiveness as a learner.

### Impulsivity and related constructs

Mildly impulsive, as opposed to reflective, behaviour is a common trait of the young. It is expected and accommodated during childhood and adolescence. Highly impulsive behaviour, on the other hand, can prove to be a disability for the young and for the adult who, for whatever reason, fails to outgrow it. It has been estimated that 30% of the school age population display impulsive characteristics to the extent that functional ability is impaired (Margolis, et al., 1977). And although empirical evidence is not available, one might reasonably conclude that impulsivity is a contributing factor to the offences committed by the young adult. For example, in 1978 over 14,000 adolescents in Ontario were adjudicated delinquent for violations of the criminal code. The vast majority of these were theft, break and enter, possession of stolen goods and mischief; violations which could readily result from impulsive sorts of thinking and behaviour. When such behaviour extends into the classroom, the result is a student who may profit only marginally from what a school has to offer.

Reflection-impulsivity as a rigorously defined cognitive style was first suggested by Kagan et al. (1963, 1966). The variable addresses the cognitive processes involved in problem-solving in an ambiguous situation, and views this process as the product of conceptual tempo (or speed of responding) and error rate. Persons who are fast and inaccurate in their response to problems are defined as impulsive; persons who are slow and accurate are defined as reflective.

Considerable debate has occurred during recent years over the definition and measurement of reflection-impulsivity (see Block, et al., 1974; Kagan and Messer, 1975; and Salkind and Wright, 1977). The outcome is general agreement that accuracy in responding, rather than speed, provides the focus for an operational definition. This will be the definition emphasized in the present study.

A number of explanations have been offered for impulsive behaviour and the arguments vary in their focus and degree of reductionism. Ward & Yeudall (1980) report only soft neurological signs associated with impulsivity in criminals. EEG abnormalities appear frequently in prisoners convicted of violent acts, however neurological dysfunction may be a concomitant rather than a cause of such highly impulsive behaviour. Less reductionistic explanations focus on deficits in the impulsive person's behaviour and learning, and resultant cognitive processes.

Behaviourally-oriented approaches to impulsivity stress the lack of self-control and self-regulating behaviours (Mahoney & Thoresen, 1974). Ainslie (1975) proposes that impulsiveness is the selection of immediate, but less desirable, rewards over delayed and more desirable rewards. In other words, impulsive persons fail to be able to delay gratification. Delayed gratification is one self-control mechanism adopted by reflective persons according to this view.

Other researchers extend a behavioural orientation to one which includes inferences about cognitive processes. Feuerstein (1980) elaborates a cognitive deficiency hypothesis in which impulsivity is the result of insufficient or inappropriate mediated learning experience. The deficit in one's early learning produces undeveloped exploratory skills reflected by difficulties in problem definition, in goal orientation and in systematic exploration of relevant cues in the environment. Similarly, Kendall & Finch (1976, 1979) develop a response inhibitory control hypothesis. Impulsive persons fail to inhibit immediately perceived ways of responding in the face of ambiguity or uncertainty because of reluctance or inability to: 1) engage in search and scan activities, 2) generate response alternatives and 3) initiate action without evaluation of consequences.

This cognitive-behavioural perspective on impulsivity is further developed by Meichenbaum. Extending various verbal hypotheses (e.g. see references to Vygotsky, Luria, Reese, and Jensen in Meichenbaum, 1977), Meichenbaum and associates (1971, 1975, 1977, 1979) propose that impulsive ways of behaving stem from a failure to use private speech in self-regulation. In a three stage process, voluntary behaviour eventually comes under the control of covert speech (verbal meditation) which provides self-regulation and monitoring. In the first stage, overt speech by others (e.g. parent, other adults) governs decisions and behaviour; in the second, the person's own overt speech assumes

the role of self-regulation; and in the third, speech is internalized, becoming covert self-instruction. Jensen (in Meichenbaum, 1977) defines verbal mediation as "talking to one's self in relevant ways when confronted with something to be learned, a problem to be solved, or a concept to be attained. In adults the process generally becomes quite automatic and implicit..."

Individuals who do not develop appropriate mediational skills will have difficulty in learning and problem-solving situations with the result that accuracy is hindered. These difficulties can present themselves in three ways (Meichenbaum & Goodman, 1971; Meichenbaum, 1977). A person: 1) may not comprehend a problem sufficiently to recall appropriate mediators which are derived from prior experience, 2) may have relevant mediators but fail to produce them and 3) may not use mediating activities to guide on-going behaviour. Deficiencies in some or all of these mediational stages can result in impulsive types of behaviour. Imagine an adolescent or adult who fails to inhibit an act of vandalism. Using a mediational deficit theory, one may hypothesize that he does not comprehend the nature of his act in the given situation; would comprehend the nature of his act if he had paused long enough to think (that is, compare his act to memory of similar acts); or does not use previous experience or knowledge in memory to generate alternative ways of behaving in the situation. Put simply, he does not stop and think. Roger Caron correctly identifies this characteristic in his

autobiography, Go Boy (1979). As his explosive aggression gets him deeper and deeper in trouble, he remarks, "If I hadn't slugged Boner, none of this would have happened" (p.43), and that he is constantly "amazed at my sudden fury" (p.57), when "like a primitive beast I always instinctively attack" (p.257).

Caron's experience offers extreme examples of overt impulsivity found to varying degrees in delinquent and criminal populations. Messer (1976) reports that in such a population, impulsivity does not decline to the extent normally expected. Feuerstein (1980) argues that impulsivity is a contributing factor in the mediational deficit of the delinquent. And Ward and Yeudall (1980) found that impulse control accounted for prominent portions of variance in a factor analytic study of personality factors associated with criminality.

This brief review of the literature on reflection-impulsivity leads to the prediction that, as a group, inmate students will tend toward the impulsive end of this cognitive style as measured by various observational instruments. (These will be described in the Methods section.) Further, the literature suggests that persons who exhibit impulsive behaviour may be at a disadvantage in the typical classroom. Deficits in mediational activities may result in poor self-monitoring and regulation, an inability to recall relevant prior learning, being easily distracted from a task and an inability to hypothesize or to predict results with efficiency. Each of these consequences can result in failure and frustration for the student, and a subsequent loss of interest in a formal educational process.

It is further proposed in the present study that our understanding of reflection-impulsivity may be enhanced by determining its relationship to other cognitive styles which have conceptual similarity to specific aspects of the construct. Three such styles will be examined.

Field dependence-independence is a cognitive style which attempts to account for the degree to which a person is able to perceive and encode discrete information from the environment. Persons who tend to be field dependent, unlike their independent counterparts, perceive their environment holistically, do not use its discrete elements, and thus fail to make what may be important discriminations. Because of this failure to distinguish between relevant and irrelevant cues in one's environment, the field dependent person's behaviour tends to become "lost" when highly salient cues are absent, or tends to be guided by social orientations provided by other persons.

A number of studies cited by Messer (1976) report a significant correlation between field dependence-independence and reflection-impulsivity in children (range = -.35 to -.62). As might be expected, impulsive persons tend to be field dependent. In the face of uncertainty or ambiguity, they inefficiently scan the environment for cues and may offer a response which shows an absence of reflective thought. It can be inferred that executive control of behaviour through cognitive mediation is either blocked or impaired by immediate and salient external cues. In a

school setting highly impulsive and dependent persons would tend to be followers, group oriented, non-committal or perhaps oscillating in their behaviour, and reluctant to formulate conclusions without reassurance.

Conceptual level (Hunt, 1971) is another cognitive style construct which has a conceptual similarity to aspects of reflection-impulsivity. An adult described as low in conceptual level would fit most definitions of immaturity. Hunt describes conceptual level as the degree to which one possesses fully developed internal structures or representations of one's self and others. Persons with a low conceptual level are described as egocentric, as impulsive and as having a low tolerance for frustration and ambiguity. They therefore require a learning environment characterized by high structure and low uncertainty. Persons with a high conceptual level are characterized as independent and reflective. They cope easily with choosing among alternatives and therefore do well in learning environments without imposed structure. Hunt (1971) reports that delinquency among a sample of low CL boys was significantly higher than among a high CL group.

A central aspect of each of the cognitive styles described above is the attending behaviour of the student. In eye movement studies conducted on subjects while reading or solving a visual problem, impulsive adults and children make fewer eye fixations than the more accurate responders (Drake, 1970; Craighead, 1978).

Impulsive search and scanning strategies are typically unsystematic, random and global. Other attentional characteristics of the impulsive person include those associated with hyperactivity - off task behaviour, irrelevant talk and movement and lack of self-control (Douglas, 1972; Campbell, 1973; Margolis et al., 1977; Kendall & Wilcox, 1979.) Therefore, if a student fails to scan the environment for appropriate information in an ambiguous situation, errors in thinking are likely and the student may be perceived as being impulsive; in the absence of internal cues, the student must rely on external direction which contributes to field-dependency; and the perceived low structure in the environment would frustrate the student having a low conceptual level. The student whose styles interfere with the "quality" of time on task will likely exhibit poor school performance when school conditions permit (See Smyth, 1979 for an overview of the research on learning time.)

#### Behavioural correlates of cognitive styles

It was stated earlier in this Introduction that if we are to take into account the individual differences of students when we attempt to teach, we must identify those specific differences which have an effect on their learning. Thus far, certain cognitive styles have been described which are expected to characterize differences prevalent in a prison population; differences which may deter the potential benefits of academic and vocational training in prison schools. However, there is a

deficiency in the research literature which prevents teachers from making use of knowledge about cognitive styles, particularly among young adult and adult populations. This deficiency is a result of the fact that operational definitions of cognitive styles are tied closely to the behaviour required by the associated psychometric measures. For example, impulsivity is defined in terms of one's performance on the Matching Familiar Figures Test (MMFT) and field dependence-independence is defined in terms of performance on the Embedded Figures Test (EFT). Both of these measures are non-verbal yet, as reviewed earlier, they purport to address a wide array of complex cognitive activity of a verbal nature. The impulsivity construct, as considered in this study, does not simply refer to the kinds of overt and aggressive behaviour which might characterize the impulsive, hyperactive child.

Like the controversy surrounding intelligence, impulsivity is what impulsivity tests measure. The validity of such constructs has not been adequately shown in terms of typical student behaviour in, for example, a classroom setting. Does the student who is defined impulsive by the traditional test of this behaviour exhibit behaviour in the classroom which teachers and other observers would agree is also impulsive? If behaviours do not manifest themselves in ecologically valid ways, discussion over cognitive styles may go the way of such bygone controversy as how many angels can dance on the head of a pin.

### Research predictions and design

If these cognitive style constructs and their inter-relationships are to be understood and found useful by teachers in the classroom a number of criteria must be met. These criteria form the predictions which are addressed in this exploratory study. It is predicted that:

- 1) An inmate student population will exhibit dysfunctional cognitive styles (e.g. impulsivity, field dependence, low conceptual level and low attentional focus) relative to a non-inmate population. Criterion: There will be a clear pattern of mean differences between psychometric measures of cognitive style for an inmate and non-inmate population.
- 2) Inmate students who possess dysfunctional cognitive styles, as assessed by traditional psychometric techniques, will exhibit patterns of dysfunctional in-class behaviour which are unique to those styles. Criterion: convergent, ecological validity will be demonstrated by patterns of significant correlations between psychometric measures of cognitive styles and derived in-class observational measures.

In order to address the issue of ecological validity of cognitive style measures, the design of the study is both naturalistic and correlational. The case for naturalistic investigation has been made frequently and well in recent years. It has been observed that tightly controlled and contrived investi-

gative approaches have not significantly broadened our understanding of how persons function in such complex settings as a classroom. Ecological validity of results can only be obtained through close examination of the actual behaviours and their interactions as they naturally occur (Stubbs and Delamont, 1976). This approach is adopted in the present study. The design places emphasis on the observation of typical in-class behaviour of inmate students in non-contrived situations.

Measures of criterion variables were developed in order to accommodate analysis using a multitrait-multimethod correlational matrix (Campbell and Fiske, 1959). The design calls for use of various methods for assessing each trait (cognitive styles in the present case) in order to determine convergent validity. In order to demonstrate ecological validity in the second prediction, it must be shown that there is convergence among psychometric measures of cognitive styles and the measures of associated in-class behaviours. Convergence will also aid in understanding of the style constructs. The parable about the blind men and the elephant provides a useful analogy. We can imagine the blind men being told what an elephant looks like in total so that they have in mind some vague notion of its characteristics. After each has had the opportunity to feel some part of the animal, can their observations converge and can they agree on its total configuration? Or, will they conclude they simply perceived things like walls, tree trunks and a hose which have little to do with their abstract notion of the beast.

## Method

### Subjects

Two groups of students were approached by the Research Associate (hereafter investigator) for the purpose of recruitment; approximately 30 male inmate students from Collins Bay Penitentiary (hereafter C.B.), and 20 female inmate students from the Prison for Women (hereafter P. for W.). Students at C.B. were told that a Writing Skills credit course was being offered and that if they chose to take the course, they would have to comply with the research requirements of the study which included being videotaped in class, interviewed subsequently about their in-class behaviour, and the completion of a battery of psychometric tests. Students at P. for W. were offered an Introductory Psychology credit course in return for their participation in the study. From this larger pool of prospective subjects, 11 C.B. and 14 P. for W. students attended the first session of regular classes at which time they signed a form

giving their informed consent to be subjects in the research project (see Appendix A for Consent Forms). However, of the 25 students who gave their signed consent, only 6 students at C.B. and 6 students at P. for W. completed all research requirements.

Table 1 presents the means ( $\bar{X}$ ) and standard deviations (s.d.) for the 12 "completers" and 13 "drop-outs" on the six demographic variables of age, length of sentence, amount of time served, last grade completed in high school, length of time enrolled in the institutional school, and current grade level. The only variable that differentiated the two groups is the length of sentence variable such that the 12 subjects in the present study (completers) were serving a longer sentence compared to those students who dropped out of the research ( $t(23) = 2.58$ ,  $p < .02$ ). Differences on criterion variables between "completers" and "dropouts" will be presented in a later section.

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Table 1 about here

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#### Settings

Regular classrooms were used within the schools at each institution. The classrooms were set up such that all of the students' desks were in rows facing the teacher's desk in the traditional fashion. This was done for two reasons: First, this seating arrangement is most conducive to the lecture/discussion

Table 1

Comparisons Between Completers and Drop-outs on Six Demographic Variables

Variable	Completers (n=12)			Drop-outs (n=13)		
	$\bar{X}$	s.d.	$\bar{X}$	s.d.	$t(23)$	<u>P</u>
Age	31.67	9.42	28.15	7.07	1.06	n.s.*
Length of Sentence (Years)	9.48	3.66	5.65	3.74	2.58	<.02
Time Served (Years)	1.63	1.17	1.7	1.09	-0.16	n.s.
Last Grade Completed In High School	10.92	2.19	9.62	1.61	1.7	n.s.
Length of Time Enrolled In the Institutional School (Years)	.6	.44	.52	.5	.42	n.s.
Current Grade Level	11.96	2.14	10.35	2.27	1.82	n.s.

Note All t-tests are two-tailed tests of significance.

\* n.s. = not significant

teaching approach which was taken at both institutions. Second, this arrangement produced the best vantage point where videotaping equipment could be operated without being overly intrusive. In this regard, students saw only the video camera and two microphones. The recording equipment was operated by the investigator at the back of the classroom where the camera could be activated and the videotape monitored without the students' knowledge. This precaution was taken to reduce the potential for "reactance"; a contaminating variable in naturalistic observational procedures whereby the "same" behaviour may differ depending upon whether subjects are aware that their behaviour is being assessed (Kazdin, 1980). The camera was placed approximately four metres from the front of the classroom and focussed on at least two students sitting adjacent to each other, one of which was designated by the investigator as the subject of interest for that particular session.

Interviews were conducted in the classification offices at each institution. These offices were equipped with a reel-to-reel tape recorder, a 3/4-inch videocassette playback unit, a 12-inch TV monitor, a desk, and two comfortable chairs.

#### Procedure

Students at C.B. met twice weekly for two hours over four consecutive weeks. The course was taught by Professor Lars Thompson of the Faculty of Education, Queen's University. The teacher presented concepts relevant to the topic of writing

skills each session in a lecture format. Students would then be required to search for examples of the concept in various sources (e.g., Reader's Digest) and relate them to the rest of the class. Homework was assigned each class and the student would bring in his written work to the next class and present it to the teacher and fellow students (see Appendix B for a sample assignment). Throughout each class, verbal exchange amongst the students was encouraged by the teacher who asked questions and elicited comments from the students. Prior to each class, the investigator told the teacher which student would be videotaped during that session. This was done to maximize the likelihood that the particular student would speak out in class by having the teacher direct his attention and questions to that student more than to any other student, but not to the point of being obvious in his intentions.

Students at P. for W. met twice weekly for two hours over seven consecutive weeks. The investigator taught the psychology course in conjunction with relevant guest speakers on staff at Queen's University. The teaching format was much the same as that at C.B. A lecture or a film provided information in the first hour and a group discussion on the particular psychological concept presented took place in the second hour.

In-class videotaping was done in the second and succeeding sessions of the regular classes. Each subject was videotaped once for a period of one-half to one hour in length. Subjects were not told they were being videotaped (although this does not

preclude the possibility that they were aware of who was being videotaped due to the directional focus of the camera and placement of the microphones). Videotaping was done during those periods in each class when verbal exchange amongst the students and with the teacher was most likely to occur.

Immediately upon completion of the videotaping, the investigator left the classroom and proceeded to the interview room to view the videotape that had just been made. An individualized interview protocol was designed for the subject during this viewing based upon a "critical incidents" approach; probing the subject about his/her thoughts and overt speech and actions prior to, during, and immediately following those incidents where the subject on the videotape behaves in ways which may be indicative of cognitive impulsivity. Examples of such incidents included (a) teacher gives instructions, (b) teacher asks the subject a question, (c) subject verbalizes either a response to a question or in an unsolicited manner, (d) the subject's gaze shifts, (e) two or more students speak at the same time, (f) the subject leaves or enters the classroom, and the like. Table 2 presents an example of the sequence of probe questions which were drawn up for a particular subject when asked a question by the teacher. This example is based on a three phase model of cognitive impulsivity which views impulse behaviour as occurring in any, or all, of the three phases of the mental act; input of information, elaboration of a response, and output of the response (Feuerstein, 1980). The investigator made

note of the precise reading of the tape counter on the playback unit everytime a critical incident occurred. This was done so that the videotape could be stopped during the interview when the subject on the videotape entered into a critical incident. The subject was then probed according to the interview protocol.

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Table 2 about here

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Immediately upon preparing the interview protocol, the investigator returned to the classroom, told the subject that he/she had just been videotaped, and was asked to accompany the investigator to the interview room. (Often, such scheduling was not possible because the subject had other commitments related to institutional activity. Therefore, a time was arranged for either that same day or the following morning when the subject could attend the interview. Most subjects were interviewed on the same day that they were videotaped. One subject was interviewed 48 hours after the initial videotaping.)

When the subject arrived at the interview room, he/she was told the following:

The purpose of this interview is to explore your style of learning. What I will do now is playback to you a videotape which was made during this morning's (afternoon's) class. You will notice that you are in

Table 2

Probe Questions for the Critical Incident:

"Teacher Asks Student a Question"

INPUT: Did you understand the question posed by the teacher at that time?  
Do you understand it now?  
Did you have time to gather all of the information necessary for a correct response?  
Would you now wait for more information before responding?  
Did you want to ask the teacher for clarification of the question or issues involved?

ELABORATION: What kinds of information did you think about before answering the question?  
What additional information would you now use?  
Did you rehearse your answer internally before replying?  
When you formulated your answer, did you consider only the most obvious answers, or did you elaborate and think about a lot of different things?

OUTPUT: Repeat to me your answer to the teacher?  
At that time, were you satisfied with the validity of your answer?  
Did you feel it required more elaboration on your part?  
Did you hastily answer the question or did you pause for a moment first to collect your thoughts?  
How would you answer the question now--would you change your original answer in any way?

the foreground of the videotape. I have had the opportunity to view the tape prior to this interview and there are a number of points along the tape which are of interest to me. I will stop the tape periodically at these points and ask you prepared questions. (Show subject the interview protocol.) The questions will generally be of two types: One type refers to the way you were thinking and feeling in class a few hours ago. You may think this is a difficult task but you will find that the cues on the videotape will facilitate your memory recall. The second type of question refers to the way you think and feel about yourself this minute as you watch yourself on the videotape. If at any point you feel you want to comment on something without me first questioning you, feel free to speak and I will stop the machine. Remember, say anything you want if you feel it has some relevance to your thoughts and behaviour in this morning's (afternoon's) class or your perceptions of yourself upon viewing the tape.

After it was ascertained that the subject understood all instructions, the audio recorder was turned on and the fact that the interview was being recorded was drawn to the subject's attention. The videocassette playback unit was then turned on and the interview proceeded with the investigator probing the subject as per the interview protocol. When the subject was engaged in speech during the interview, the videocassette was put on pause. In addition to asking the subject questions based

on a critical incidents approach (such as those in Table 2), other areas were probed regarding: (a) subject's motivation for taking the course; (b) subject's attitude towards classmates, subject matter, and teacher; (c) what the subject thought of himself/herself as a student; (d) the generality of his/her in-class behaviour in relation to other classroom activities that the subject has experienced; and (e) what the subject thought of the interview. The interview was approximately one hour in length after which the subject was thanked for his/her co-operation and excused.

After the subject had been videotaped and interviewed, a composite videotape was made. This was done by dubbing the subject's audiotaped interview onto a portion of the soundtrack of his/her videotape. The composite videotape was "frozen" at those points when the subject and investigator were engaged in dialogue during the interview. The final product was a one-hour composite videotape in which the viewer saw and heard the subject in class, as well as hearing the subject's comments about himself/herself at those critical incidents when the investigator probed the subject about his/her thoughts and behaviour during the interview.

#### Criterion variables

All subjects who completed the research requirements were administered the following psychometric tests on either an individual or group basis at various times throughout the course:

(1) Matching Familiar Figures Test: Adult Adolescent Set (MFAT). The MFAT is an individually administered, perceptual test

designed to assess an individual's cognitive functioning along the continuum of "reflection-impulsivity", operationally defined as the speed and accuracy with which an individual attempts a solution to problems high in response uncertainty (Kagan, 1965). The test format involves simultaneous presentation of a stimulus figure along with eight facsimiles differing in one or more details (see Appendix C for a sample of the MFFT items). The subject was told to choose that facsimile which duplicated the stimulus figure, responding as many times as necessary until the right item was chosen. Two practice and 12 different test figures were presented. The investigator kept track of the mean number of errors over the 12 test items. Those individuals with few errors are considered to be reflective while those who make many errors are considered impulsive (Block, Block, & Harrington, 1974).

Numerous reliability/validity studies have been conducted on the childrens' version of the MFFT. In summarizing this data, Messer (1976) reports one to eight week test-retest reliability estimates ranging from  $r = .39$  to  $r = .8$  for errors. Messer notes there is a moderate association between reflection-impulsivity (assessed by MFFT) and field-dependence/independence (assessed by the Group Embedded Figures Test) such that reflectives are significantly more field-dependent than are impulsives. Recently, Kendall and Wilcox (1979) have provided some criterion validity for the MFFT, finding that errors correlate moderately, yet significantly, with the scores on the Self-Control Rating Scale (a teacher rating scale for assessing the degree of self-control and impulsivity in children).

(2) Slosson Intelligence Test (SIT). The SIT is an individually administered, quick (20 minutes) estimate of intelligence (Slosson, 1961). The subject was asked questions pertaining to vocabulary and mental arithmetic and the questions became increasingly difficult to solve as the test progressed. The test terminated after the subject failed ten consecutive items. Raw scores were converted to a Mental Age and finally to an Intelligence Quotient (IQ) with a mean of 100. A two-month test-retest reliability of  $r = .97$  was found in a large group of subjects from age 4 to 50. Furthermore, a concurrent validity coefficient of  $r = .97$  has been obtained between the SIT and the Stanford-Binet (form L-M) in a group of adult subjects (Slosson, 1961).

(3) Group Embedded Figures Test (GEFT). This test is a group administered, perceptual test designed to assess a person's functioning along the continuum of "field dependence-independence"; the degree to which an individual can perceive discrete parts of an informational array without being perceptually dominated by its overall organization (Witkin, Moore, Goodenough, & Cox, 1977). Subjects were given a maximum of ten minutes in which to outline (or trace) 18 previously seen simple figures within larger complex figures which had been so organized as to obscure or embed the sought-after simple figure (see Appendix D for a sample problem of the GEFT). Each simple figure outlined perfectly was given a score of one yielding total GEFT scores rang-

ing from 0 to 18, the higher score reflecting greater field-independence. Norms for the GEFT are available for both male and female college students. Men, compared with women, perform slightly yet significantly more in the direction of greater field independence. A parallel test reliability coefficient of  $r = .82$  has been estimated for the GEFT in a large group of college students (Witkin, Oltman, Raskin, & Karp, 1971). Witkin et al. (1977) have summarized a large body of research on the GEFT, noting that a relatively field-dependent person is (a) likely to be more attentive to and make use of prevailing social and cognitive frames of reference to guide personal conduct and thought processes, (b) better at learning and remembering materials with social content, (c) more affected by criticism, externally defined goals, and reinforcement, and (d) less able to take a critical element out of a familiar context (e.g., mental or physical task) and use it in a different context.

(4) Conceptual Level: Paragraph Completion Method (CL-PCM).

This test is a group administered, semi-projective method of assessing thought samples related to how a person thinks about such ambiguous topics as conflict or uncertainty, and rule structure and authority (Hunt, Butler, Noy, & Rosser, 1977). Subjects were given three minutes in which to write down all they could on each of six topics or stems (see Appendix E). All completed protocols were sent to the Ontario Institute for Studies in Education which provides a scoring service where a trained

rater assigned a score from 0 to 3 to each stem. Rating criteria are based on (a) the degree of conceptual complexity as indicated by discrimination, differentiation and integration, and (b) the degree of interpersonal maturity as indicated by self-definition and self-other relations. The total CL-PCM score for a subject was based on an average of that subject's highest three of six responses in the completed protocol. The higher the subject's total CL-PCM score, the more that subject can be thought to (a) need less structure in the learning environment, (b) possess increasing conceptual complexity, and (c) possess increasing interpersonal maturity. The CL-PCM has norms for a large number of different reference groups, and a median inter-rater reliability estimate of  $r = .86$  has been reported in a group of 26 separate reliability studies conducted on the CL-PCM (Hunt et al., 1977). Furthermore, a three-month test-retest reliability estimate of  $r = .67$  has been reported in a group of 36 college students (Gardiner & Schroder, 1972).

(5) Test of Attentional and Interpersonal Style (TAIS). The TAIS (Nideffer, 1976) was designed for use in career and clinical counselling. The 144 items in the paper-and-pencil test are grouped into 17 conceptually different scales of attentional and interpersonal factors (see Appendix F). Six of the scales measure particular attentional abilities, two provide information about the individual's ability to control behaviour, and nine describe how the person is most likely to behave in interpersonal situations. All prospective subjects at both institutions were

administered the TAIS during the first session of regular classes. The students rated each item for the degree to which that item typified their attentional or interpersonal style on a five-point bipolar scale anchored "never" and "always". The completed tests were hand scored with the use of scoring templates by summing the scores for all items within each scale (Nideffer, 1977). Normative data are available for a large number of different reference groups (e.g., students, police applicants, medical patients). The TAIS possesses high test-retest reliability ( $r = .83$ ) assessed over a two-week time interval. Some predictive validity has been demonstrated for the attentional scales: College students judged by their instructor to demonstrate in-class leadership and contribute to class discussion described themselves on the TAIS as (a) able to integrate ideas from many areas effectively, (b) able to avoid errors of underinclusion, and (c) processing large amounts of information. In contrast, students identified as withdrawn and unable to deal with more than one topic at any one time described themselves on the TAIS as (a) possessing uncontrolled attentional processes, and (b) processing little information (Nideffer, 1976).

#### Methods of assessment

Four different methods of assessment were employed to assess each of the four cognitive styles of reflection-impulsivity, field dependence-independence, conceptual level, and attentional focus. These methods include: (1) Psychometric Tests, (2) Judges' Ratings, (3) Observer Ratings, and (4) Teachers' Ratings.

### (1) Psychometric Tests

These measures were derived from the battery of psychometric tests described above and include the following:

(i) PRIMP (Psychometric Measure of Reflection-Impulsivity).

This measure refers to the mean number of errors on the Matching Familiar Figures Test. High scores reflect greater impulsivity.

(ii) PBCON (Psychometric Measure of Behavioural Control).

This measure is one subscale on the Test of Attentional and Interpersonal Style (TAIS). It is labelled Behavioural Control (BCON) and is a self-report measure of the subjects' willingness or ability to exert control over their behaviour.

Scores may range from 0 to 52 where high scores on this measure indicates a subject who acts more impulsively and conforms less to conventional moral and ethical Standards.

(iii) PFDI (Psychometric Measure of Field Dependence-Independence). This measure is derived from the Group Embedded Figures Test. Scores may range from 0 to 18 where high scores reflect greater field independence.

(iv) PCL (Psychometric Measure of Conceptual Level).

This measure is derived from the test called Conceptual Level: Paragraph Completion Method. Scores may range from 0 to 4 where high scores reflect a greater degree of conceptual level.

(v) PAF (Psychometric Measure of Attentional Focus).

This measure is another subscale on the Test of Attentional and Interpersonal Style. Called External Overload (OET), it represents a self-report measure of attentional focus. Scores on this scale

may range from 0 to 48 where high scores reflect subjects who report that they make more cognitive mistakes when confused and overloaded by environmental information.

## (2) Judges' Ratings

Due to the somewhat inferential nature of the behavioural concomitants for the four cognitive styles under investigation, a "social validation" procedure (Wolfe, 1978) was invoked as one of the four assessment methods. The procedure is used when the constructs of interest involve multiple behavioural components that cannot be easily specified. The procedure involves having "relevant" judges view videotapes of behavioural samples and rate subjects on global dimensions like reflection-impulsivity. These ratings are then averaged over the judges to produce an aggregate rating. In addition, judges list those specific behavioural cues that aided them in making their overall rating. Based on a content analysis of these cues, trained observers code the videotapes for these specific behaviours. Finally, those specific behavioural codes which correlate significantly with the judges' global ratings may be seen as representing valid behavioural correlates of the construct under investigation (like reflection-impulsivity).

To pursue this general methodology, five Masters of Education students from the Faculty of Education at Queen's University served as judges. Each judge had a number of years teaching experience and therefore can be assumed to possess some general knowledge of each of the four cognitive styles as applied to classroom learning situations.

After signing an "Agreement of Confidentiality", each judge went through an initial briefing session during which the investigator reviewed the nature of each of the cognitive styles. Judges were given copies of descriptive phrases that described the extreme behaviours of each of the four cognitive styles (see Appendix G). Judges were asked to write down the name of one or more students they had taught in the past who typified many of the behaviours listed under each cognitive style and to use them as a comparative standard when making global ratings of the subjects in the present study.

Each judge viewed the 12 composite videotapes in a different random order. After viewing a tape, the judge rated the subject by placing a mark on four 100 millimeter scales anchored in the following way:

Impulsive



Field Dependent



Low Conceptual

Level



Poor Attentional

Focus



Four measures were derived from this procedure:

- (i) JRIMP (Judges' Rating of Reflection-Impulsivity).
- (ii) JFDI (Judges' Rating of Field Dependence-Independence).
- (iii) JCL (Judges' Rating of Conceptual Level).
- (iv) JAF (Judges Rating of Attentional Focus).

Each measure is the mean of the 5 judges' ratings per subject on each of the four cognitive styles. To provide some consistency in ratings, judges were told that a rating of 50 represented "average" or "normal" performance with regard to the particular construct.

In addition to these global ratings, judges were asked to briefly describe those specific behavioural cues that influenced their ratings of the student, and to estimate what percentage of their ratings was based on the interview portion of the composite videotape (see Appendix H for Judges' Rating Scale).

Judges viewed each tape in private and no more than two tapes were viewed per session to reduce the possibility of fatigue effects. Judges were paid sixty dollars each for their participation in the study.

### (3) Observer Ratings

A content analysis was conducted on the judges' behavioural cues and the data are presented in Table 3. Those cues that were nominated by the judges with high frequency, and those which possessed some objective behavioural referents, were chosen for the observer rating scale. The scale consists of nine

Table 3Content Analysis of the Judges' Behavioural Cues

<u>Frequency</u>	<u>Descriptive Phrase</u>
<u>Reflection-Impulsivity</u>	
17	- responds quickly/pauses before answering.
13	- produces thoughtful and detailed answers/ responses are short with little or no elaboration.
12	- interrupts others.
12	- settles/incapable of settling down to work.
9	- off-task behaviour (e.g. talking off topic, plays with school material, leaves classroom).
4	- limited awareness of the need for additional data.
<u>Field Dependence-Independence</u>	
13	- more/less affected by criticism.
11	- prefers/does not prefer to be physically close to others.
10	- easy to agree with/persists in differing opinion.
9	- is attentive/unattentive to prevailing social frames of reference.
9	- depends on others for direction and explanation.
7	- models own behaviour on behaviour of others.
7	- imposes/fails to impose structure spontaneously.
<u>Conceptual Level</u>	
22	- formulates own concepts and holds internal standards.
6	- seeks concrete rather than abstract ideas.
4	- behaves immaturely.
4	- does not formulate own concepts or ideas (conventional).
<u>Attentional Focus</u>	
16	- easily distracted/not distracted by sights and sounds in the classroom.
14	- ability/inability to focus attention and stay on topic.
11	- ability/inability to share attention.

behavioural codes, three for reflection-impulsivity and two for each of the other three cognitive styles. Each item was divided into "classroom" and "interview" so that particular behaviours could be coded depending upon the context in which it was observed (see Appendix I).

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Table 3 about here

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The principle investigator rated all of the composite videotapes and one of the co-investigators rated a random 50% of the tapes for the purposes of providing inter-rater agreement estimates. An interval recording procedure was used, each interval being ten units in length on the tape counter of the playback unit (or approximately 40 seconds). An interval was scored if the behaviour occurred at anytime within that interval, even if it was a continuation of the same behaviour from a previous interval.

Data were summarized for each subject in the following way. First, intervals scored by the observer were summed within each of the 18 behavioural codes, each divided into "classroom" and "interview"). Second, an examination of this data revealed marked variability in frequencies between "interview" and "classroom" for the 9 behavioural codes. Therefore, frequencies for "interview" and "classroom" were summed together within each of the 9 behavioural codes. (One behavioural code, "seeks

Concrete referents", was dropped from further analysis because of extremely low frequencies observed across all subjects). Third, the nine frequencies were transformed into z scores, one z score for each behavioural code. Fourth, and finally, z scores were summed within each group of behavioural codes representing a specific cognitive style (3 for reflection-impulsivity, 2 each for field dependence-independence and attentional focus, and only 1 for conceptual level).

The following four measures expressed in standard score form were derived from the above procedure: (i) ORIMP (Observer Rating of Reflection-Impulsivity), (ii) OFDI (Observer Rating of Field Dependence-Independence), (iii) OCL (Observer Rating of Conceptual Level), and (iv) OAF (Observer Rating of Attentional Focus). Higher positive z scores represent increased observed frequency of behaviours indicative of impulsivity, field dependence, lower conceptual level, and poorer attentional focus.

#### (4) Teachers' Ratings

This measure was designed to assess ecological validity for the three other measures described above. The measure consists of 23 items representing behavioural concomitants of the four cognitive styles as described in the current literature. All of the items for the reflection-impulsivity subscale were drawn or adapted from the Self-Control Rating Scale (Kendall & Wilcox, 1979).

The scale was completed by two teachers and two school supervisors at P. for W. Five teachers and one school supervisor at C.B. completed the instrument. The staff were instructed to rate all students (including those who dropped out of the research) on each item for frequency of occurrence of that behaviour in typical classroom situations, and to assign a value of 0 (rarely or never), 1 (sometimes), or 2 (frequently or always). If the rater was not familiar enough with a particular student to make a reasonably accurate rating then he/she simply placed an "X" in the corresponding box (see Appendix J).

The instrument is divided into four subscales, one for each of the four cognitive styles under investigation. Scoring of the instrument involved averaging all teachers' ratings of a particular subject over individual items, and then summing these averages across all items within each subscale for that subject. Four measures were derived from this procedure: (i) TRIMP (Teachers' Rating of Reflection-Impulsivity), (ii) TFDI (Teachers' Rating of Field Dependence-Independence), (iii) TCL (Teachers' Rating of Conceptual Level), and (iv) TAF (Teachers' Rating of Attentional Focus). Higher scores represent students who were judged by their teachers as being more impulsive, field dependent, lower in conceptual level, and poorer in attentional focus.

Table 4 presents a summary of all measures described above. This outline serves as the basis for determining the validity of each measure within a multitrait-multimethod framework as proposed by Campbell and Fiske (1959).

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Table 4 about here

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Table 4Multitrait-Multimethod Matrix: Summary of Criterion Measures

		Methods of Assessment			
		Psychometric (P)	Judge (J)	Observer (O)	Teacher (T)
<u>Cognitive Styles (Traits)</u>					
Reflection-Impulsivity (RIMP)		PRIMP PBCON	JRIMP	ORIMP	TRIMP
Field Dependence-Independence (FDI)		PFDI	JFDI	OFDI	TFDI
Conceptual Level (CL)		PCL	JCL	OCL	TCL
Attentional Focus (AF)		PAF	JAF	OAF	TAF



## RESULTS

### Characteristics of sample

The case cannot be made that the sample of inmate students who served as subjects are representative of a wider inmate population. The heterogeneity of the subject pool was restricted as a result of both self-selection of students into the study and subsequent attrition. It will be recalled that of the 25 students who consented to participate, only 12 completed all research requirements.

It was reported previously in Table 1 that "completing" and "drop-out" subjects did not differ significantly on demographic variables, except for "length of sentence." However, measures on certain criterion variables which were collected prior to attrition (TAIS) or which did not require the subjects to be present (teachers' ratings) show significant mean differences.

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Table 5 about here

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Table 5  
 Comparisons Between Completers and Drop-outs on Six Criterion Measures

Variable	Completers		Drop-outs		P
	$\bar{X}$	s.d.	$\bar{X}$	s.d.	
TRIMP	3.03	1.85	6.04	3.66	-2.43(20) $\leq .05$
TFDI	4.08	.9	4.12	1.51	-0.08(23) n.s.*
TCL	3.23	1.3	4.82	1.25	-3.12(23) $\leq .01$
TAF	2.04	1.73	4.15	2.8	-2.4 (19) $\leq .05$
PAF	17.58	5.38	21.54	5.67	-1.79(23) $\leq .09$
PBCON	21.42	4.58	24.23	7.24	-1.15(23) n.s.

Note All t-tests are two-tailed tests of significance.

\* n.s. = not significant

As shown in Table 5, teachers perceived the "drop-outs" as having more dysfunctional characteristics than "completers" on three of the four cognitive styles they assessed ( $p < .05$ ). Teachers perceived "drop-outs" as having characteristics indicative of impulsivity (TRIMP), low conceptual level (TCL) and low attentional focus (TAF). These differences can be interpreted as relatively unbiased. Teachers were not particularly aware of individual students' status in the study when they completed the behaviour scales.

It is inferred, therefore, that the resulting sample is atypical of the total inmate student population. Interpretation of results is thus restricted, however certain extrapolations will be ventured in the Discussion section.

The first prediction stated that inmate students would exhibit dysfunctional cognitive styles relative to a non-inmate population, as measured by psychometric measures. The prediction is not supported by the results. Means reported in Table 6 for subjects do not appreciably differ from means for non-inmate groups. It should also be noted that the mean IQ, as measured by the Slossen Intelligence Test, was 121.5 ( $s.d = 16.4$ ) for the subject group. Clearly, then, subjects on average cannot be considered cognitively dysfunctional on the basis of the psychometric tests employed in this study. However, reasons why a facile interpretation of these results should be avoided will be addressed in the Discussion section.

Table 6  
 Comparisons Between Inmate Sample and Non-Inmates  
 on Psychometric Tests of Cognitive Style

Style	Test	Prison Sample (n=12)		Comparative Sample	
		$\bar{X}$	s.d.	$\bar{X}$	s.d.
Reflection- Impulsivity	MFFT (errors)	7.50	5.62	8.02 <sup>a</sup>	4.64
Field Dependence- Independence	BCON subscale of the TAIS	21.42	4.58	21.10 <sup>b</sup>	5.70
Conceptual Level	GEFT	12.80	5.04	19.50 <sup>c</sup>	5.10
Attentional Focus	CL-PCM	1.98	0.44	12.00 <sup>d</sup>	4.10
	OET subscale of the TAIS	17.58	5.38	10.80 <sup>d</sup>	4.20

Notes

<sup>a</sup> Based on 226 children 12 years of age. By extrapolation, this is considered a meaningful comparison group because number of errors stabilizes after age 9. (Salkind, unpublished manuscript).

<sup>b</sup> Based on 64 college students (Nideffer, 1977).

<sup>c</sup> Based on 30 medical patients (Nideffer, 1977).

<sup>d</sup> Based on 155 male college students and 242 female college students, respectively (Witkin et al., 1971).

<sup>e</sup> Based on 93 grade 12 students and 50 college students, respectively (Hunt et al., 1978).

### Convergent and ecological validity

The second prediction stated that students who score toward the dysfunctional on psychometric tests of cognitive styles will exhibit associated behaviours in the classroom which are also dysfunctional. Before directly addressing this statement, the reliability and validity of the measure developed for this study must be given attention.

Validity and reliability of observational measures. It will be recalled that in addition to the psychometric measures obtained for each subject on the four cognitive styles, in-class behaviour of subjects was assessed by their teachers, by five judges and by an independent observer. The judges and observer made their assessments based on viewing the composite videotapes of in-class lessons and interviews.

In order to establish validity for the judges' observations of students' behaviour, a social validation procedure was used. In this analysis, the "goodness" of each set of measures requires assessment prior to interpreting their association.

Reliability of judges' observations was assessed by Kendall's Coefficient of Concordance (Kendall, 1970). The coefficient (W) reported in Table 7 indicates significant levels of agreement ( $p < .05$ ) among judges for all measures except those associated with field dependence-independence. Judges agreed on their assessments of each subject's level of behaviour associated with reflection-impulsivity, conceptual level and attentional focus (see Appendices G and H for a description of these behaviours).

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Table 7 about here

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The second set of variables associated with the social validation procedure is the observers' ratings (see Appendix F for description). Interpretation of the reliability of these measures is tenuous. Agreement on occurrence of discrete behaviours between the primary and secondary observer was low. Agreement on occurrence of impulsive behaviour was 36%, field dependent behaviour was 12%, low conceptual level was 13% and poor attending behaviour was 27%. These proportions of agreement leave in some doubt the reliability of the primary observer's ratings. However, they will be used in subsequent analysis with some degree of confidence for the following reasons: 1) the primary observer can be considered highly familiar with the constructs being measured, 2) the second observer was not trained to criterion, 3) there is a high degree of subjectivity and inference in the measures and 4) the behaviours to be identified did not occur frequently and there was high agreement between raters on the frequency of their non-occurrence!

Social validation of the judges' ratings is determined by the correlations between their ratings and frequency of occurrence of specific behaviours identified by the observer for each cognitive style (see Appendix I). Only the observers' identification of conceptual level behaviour, where the specific behaviour observed

Table 7

Kendall's Coefficient of Concordance (W) for  
Judges' Assessments of Cognitive Style Behaviours

<u>Cognitive Style Measure</u>	<u>W</u>	<u><math>\chi^2</math></u>	<u>p(df)</u>
Reflection-impulsivity	.46	23.05	>.01(11)
Field dependence-independence	.22	12.32	n.s.
Conceptual level	.43	23.52	>.02(11)
Attentional focus	.38	20.83	>.05(11)

was "avoids formulation" correlated significantly with the judges' rating of conceptual level (rank order  $r = -.74$ ,  $p < .01$ ). Thus, conceptual level is the one style which can be clearly validated in this manner. It is apparent from this result that judges were highly dependent on a subjects' willingness to formulate a response to a question or an opinion as a central operationalization of the conceptual level construct. This same behaviour will figure prominently in subsequent discussion of the results.

With regard to teachers' assessments of individual subjects on the four styles, no reliability statistic can be reported. Teachers were not sufficiently familiar with all subjects within an institution to completely rate each one. The result is considerable missing data and no reliability estimate. The investigators subjective impression is that agreement is reasonably good where multiple measures do occur for a subject.

The multitrait-multimethod matrix. The multitrait-multimethod matrix shown in Table 8 provides the basis for assessing the second prediction, and for a more far-reaching discussion of the variables and their inter-relationships.

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Table 8 about here

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Table 8

## Multitrait-Multimethod Matrix

Notes. Each heterotrait-monometabol triangle is enclosed by a solid line. Each heterotrait-heterometabol triangle is enclosed by a broken line. Correlations are Spearman Rank-Correlation Coefficients. Degrees of freedom vary from 9 to 11 due to certain missing data values in the Teacher's Ratings.

Figure 1 displays a correlation matrix for 16 variables. The variables are arranged in a 5x5 grid. The diagonal elements are solid lines with values: PRIMP (-.67), PFDI (-.60), PCL (.64), PAF (.64), JRIMP (.64), JFDI (.67), JCL (.67), JAF (.75), TRIMP (.50), TFDI (.04), TCL (.02), TAF (.01), ORIMP (.11), OFDI (.22), OCL (.44), and OAF (.16). The off-diagonal elements are dashed lines. Significant correlations are marked with asterisks (\* or \*\*): PCL has a significant positive correlation with PAF (.18) and JCL (.12); PAF has a significant positive correlation with JCL (.12); JRIMP has significant positive correlations with JFDI (-.06), JCL (.34), and JAF (.54); JFDI has significant positive correlations with JCL (.23) and JAF (.24); JCL has significant positive correlations with JAF (.54) and TCL (.21); JAF has significant positive correlations with TCL (.37) and TAF (.35); TRIMP has significant positive correlations with TFDI (.06) and TCL (.05); TFDI has significant positive correlations with TCL (.25) and TAF (.15); TCL has significant positive correlations with TAF (.30) and OAF (.30); TAF has significant positive correlations with OAF (.35); ORIMP has significant positive correlations with OFDI (-.29) and OCL (-.29); OFDI has significant positive correlations with OCL (.09) and OAF (.40); OCL has significant positive correlations with OAF (.52) and JAF (.58); OAF has significant positive correlations with JAF (.40) and PRIMP (-.45).

The matrix arranges the inter-correlations of all variables so that the issues of convergent and discriminant validity can be readily addressed. Convergent validity occurs when the correlation coefficient in the validity diagonals of the heterotrait-heteromethod blocks are significantly different from zero. Such significance simply indicates that the two methods for measuring a construct are both tapping the same construct. Discriminant validity occurs when the above validity coefficients exceed correlation values within the heterotrait-monomethod triangles. This indicates that measures are tapping independent constructs (see Campbell and Fiske, 1959 for a full discussion of the multitrait-multi-method matrix).

Staying within the confines for the moment of the second prediction, the matrix indicates convergent validity between a psychometric measure and an observational measure only for methods associated with the reflection-impulsivity cognitive style. Students' error rates on the Matching Familiar Figures Test (PRIMP) correlate with teachers' (TRIMP) and judges' (JRIMP) ratings of the style in the predicted directions. Convergent validity involving the other psychometric tests was not found.

It can be argued that the power of the reflection-impulsivity construct for describing individual differences among inmate students is further enhanced by the pattern found for discriminant validity coefficients among the psychometric measures. This pattern may also account for the lack of convergent validity for

the other psychometric measures. The pattern shows that all other psychometric measures correlate significantly with PRIMP, but do not correlate among themselves. This suggests that each of these measures is addressing some aspect of impulsive behaviour defined in terms of error rate on the MMFT, and by themselves do not address entirely unique sorts of behaviour. As a result, they provide an additional understanding of the reflection-impulsivity construct. It will be recalled from the Introduction section that these measures were chosen because of either empirical or intuitive reasons which linked them to reflection-impulsivity. The lack of discriminant validity for these measures serves to confirm their selection.



## Discussion

### The student sample

It was reported in the Results that the student sample did not, on average, reflect dysfunctional styles as measured by the psychometric instruments; and that the sample was perhaps most representative of the "cream of the crop." Two important questions emerge; can extrapolations be made from the data in order to describe a more heterogeneous population? And, is the sample of students as cognitively functional as the psychometric measures suggest?

With regard to the first question, there is cautious support for extrapolation. That is to say, the relationships likely hold for a wider range of inmate students than the current sample. Cautious support is based on the strength of the correlations which are high and have met the stringent test of significance for such a small sample of subjects. The second criterion which must be met for confident extrapolation is linearity in the relationships, yet this must remain largely an unknown in the

present study. The restricted variance does not provide an opportunity to observe extreme scores. The question cannot be fully addressed without a larger sample of students and increase in variance. Indirect evidence exists in examination of the correlations, however. Eventhough the rank-order correlation procedure used does not assume linearity, it would not be likely that high correlations would be obtained with highly curvilinear data. Where high correlations are found, therefore, relationships can be assumed to be relatively linear and predictive of a similar pattern beyond the available data.

The second question asked if the students in the sample can be regarded as functional as implied by the psychometric measures. The lack of convergent validity for all but the reflection-impulsivity measure suggests that the question is irrelevant. As will be shown in the following discussion of ecological validity, these measures are not highly useful in the prediction of classroom behaviour. Therefore, the in-class behaviours themselves must be examined. The variance in teachers' and judges' ratings is relatively wide in a number of instances (see Appendix K). Judges and teachers identify substantial variance among subject in behaviours related to impulsivity, to conceptual level and to attentional focus. In other words, dysfunctional behaviour was observed relative to judges' and teachers' own standards, regardless of individual student performance on psychometric instruments.

Graphic, though limited, demonstration of this conclusion is presented in Figure 1. The scores of two extreme students are plotted and compared. Student A performs consistently above the group mean on all measures; student B is consistently below the group mean except on JFDI and TAF. Inspection of individual scores for subjects reveals at least three additional students among the 12 who have profiles similar to student B. And had the "drop-outs" remained in the study, these would likely have been many more subjects exhibiting dysfunctional styles (see Table 5).

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Figure 1 about here

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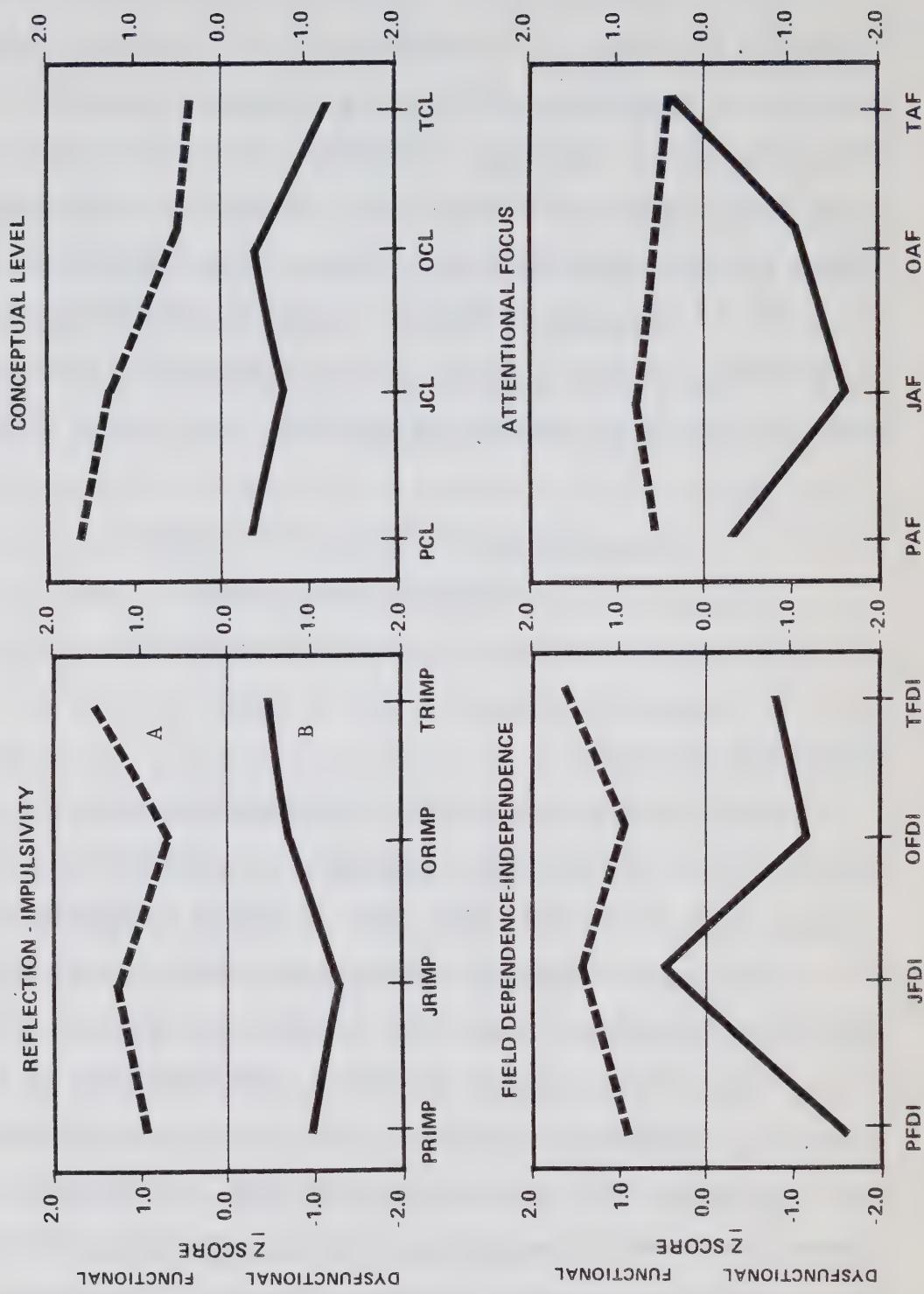
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#### **Ecological validity**

Central to the purpose of this study has been the determination of ecological validity for measures of cognitive style. That is to say, just what do these styles mean in terms of typical performance of students engaged in learning in typical educational settings? Are style constructs such as reflection-impulsivity useful to the educator? Results from this study suggest a reasonably confident "yes", but only if observational measures of student performance are used in addition to carefully chosen psychometric measures. Results reported here indicate that exclusive reliance on paper-and-pencil, psychometric tests for diagnostic, placement or predictive purposes would be a highly questionable practice.

Figure 1

Comparison of Two Extreme Subjects on the  
Criterion Measures of Cognitive Style

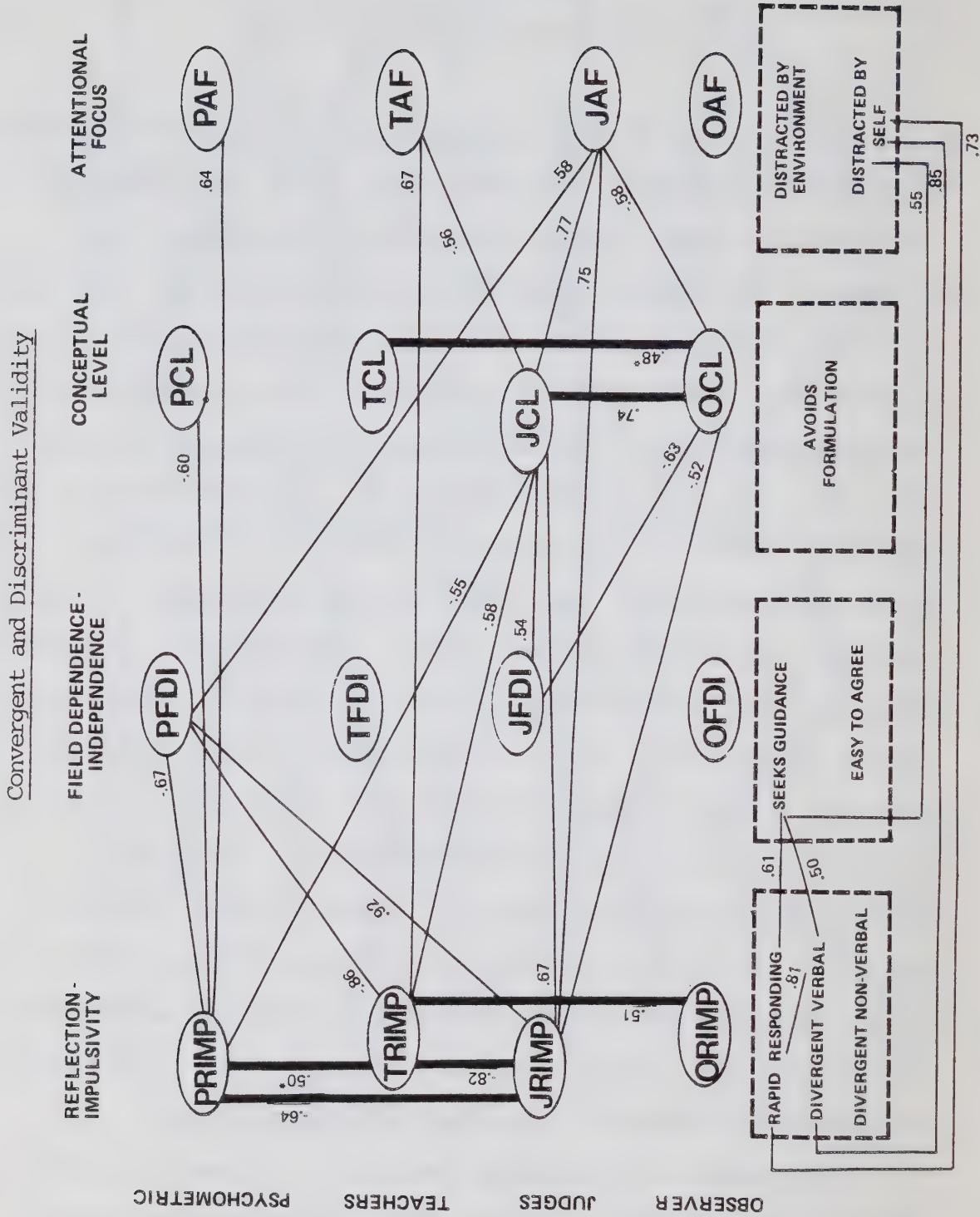


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Figure 2 about here  
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Figure 2 is an attempt to represent the important patterns of correlations resulting from this study. (We are sympathetic with those readers whose initial reaction is bewilderment and avoidance. We've been there too!) The correlations in Figure 2 are drawn directly from the multitrait-multimethod matrix and are arranged as a "map" of relationships to facilitate discussion of ecological validity. The heavy vertical lines are indicative of convergent validity across measures of a single cognitive style. Horizontal lines are indicative of lack of discriminant validity among style measures. And diagonals are indicative of shared variance across measures and styles. The vertical arrangement of measures forms an inference hierarchy. Observer measures at the bottom (ORIMP, OFDF, etc.) are the least inferential. They are frequency counts of specific behaviours related to the style construct. At the top of the hierarchy are the highly inferential psychometric tests of styles (PRIMP, PFDI, etc.). On the basis of non-verbal tasks or self-report data, which have little obvious relationship with complex cognitive behaviours in natural settings, these measures result in highly inferential statements about one's functional behaviour.

The patterns of convergent validity in Figure 2 provide evidence of ecological validity for reflection-impulsivity. Teachers, judges and observers are in significant agreement that

Figure 2  
Correlational Map Showing  
Convergent and Discriminant Validity



they are identifying behaviours in the classroom which are associated with performance on the MMFT (as well as the other psychometric measures, given the lack of discriminant validity.) At the lowest level of inference, the observer identified a high incidence of rapid responding and divergent verbal behaviour by subjects whom teachers also characterized as impulsive. They describe the impulsive student as prone to make errors, to reply without thinking, to be disruptive and to have difficulty getting down to work. And judges tend to agree with teachers'; however the "map" indicates judges were also using the observer code of "avoids formulation" as part of their characterization of the subjects.

Good ecological validity is also shown for conceptual level, but only among observational measures. There is no convergent validity for its psychometric measure. Teachers, judges and observer agree that they are observing dysfunctional behaviour which is typified by the subjects' unwillingness to formulate a conclusive reply to a problem or question. Teachers add other characteristics of the low conceptual level student such as tendencies to give conventional replies, to be dependent on others and to behave immaturely in social situations.

No ecological validity is shown for field dependence-independence or for attentional focus at any level of measurement, which is to say they have little unique construct validity. However, they do appear useful in contributing to an understanding of the other constructs. PFDI and JFDI share significant portions of variance with other measures, as does PAF, TAF. Field

dependence and low attending behaviour appear to be facets of impulsivity, in addition to conceptual level.

What emerges from this array of associations is the conclusion that the cognitive styles chosen with their various levels of measurement in this study all address facets of a holistic and complex pattern of behaviour. Functional and dysfunctional patterns can be effectively identified in naturalistic contexts both by teachers and by persons who observe only a sampling of this behaviour. Reflection-impulsivity emerges as a useful global construct for describing functional behaviour. Because it shares attributes with other style constructs, as predicted, its definition and utility are enhanced.

#### Some implications

Synthesizing styles. Anyone familiar with the literature on the identification and description of cognitive processing variables, of which cognitive styles is a subset, must at least occasionally become frustrated with the plethora of variables generated by psychologists who may be more worried about tenure, legacies or epitaphs than the parsimony of their discipline. When encountering this over-abundance of invented constructs, an intuitive reaction is that many are addressing essentially the same phenomenon or processes and are different only in the label applied. Little wonder that teachers have dismissed the utility of much of this research. The work reported in this study gives credibility to the notion that a synthesis of constructs is both reasonable and possible.

Aspects of a theory of corrections instruction. In the Introduction it was stated that the development of a theory of instruction related to corrections would require, among other things, useful description of relevant individual differences among inmate students. One may define "useful" as differences which show ecological validity (can readily be observed in the classroom) and define "relevant" as differences which have an effect on student learning. Our expanded definition of reflection-impulsivity offers teachers a unified construct for addressing what appears to be a particularly salient and useful cognitive style. It has been demonstrated that this style can be reliably observed and can account for an array of interdependent behaviour patterns in students - patterns reflecting attributes of less salient styles which alone lack discriminant and convergent validity. The relevance of this style has been determined elsewhere in the literature and was reviewed in the Introduction; highly impulsive cognitive behaviour interferes with effective learning in the typical classroom.

Another requirement of a theory of instruction described in the Introduction is the establishment of instructional conditions which take into account individual differences. Given a group of cognitively impulsive students, the school can react in two primary ways: the learning environment for these individuals can be adapted so that differences are accommodated; the differences can be modified, leaving the environment unchanged; or a combination of the two (Campbell, 1979).

Given our expanded view of reflection-impulsivity, the research literature relevant to the cognitive styles addressed in this study suggests conditions which will accommodate impulsivity with a view towards its long-term modification. Initially, an accommodating learning environment would be characterized by: 1) a highly structured curriculum, 2) teacher as primary decision-maker, 3) small group format, 4) small increments in objectives which are easily attainable, 5) frequent formative evaluation and 6) minimum distraction. These conditions should be somewhat obvious and are intended to get the impulsive student performing at a reasonably high level by removing from the environment uncertainty and other factors which interact with impulsivity to cause poor achievement.

As the student achieves some success in an accommodating environment, conditions may be changed to modify impulsive behaviour. In their overviews of the literature on impulsivity and its modifiability, Kendall and Finch (1979) and Messer (1976) conclude that modification can be accomplished and that the most powerful approaches for the adult are likely those which involve training on attention and self-verbalization strategies. Self-instruction training procedures employed by Meichenbaum (1975, 1977) require the student to overtly verbalize problem definition, alternative approaches to resolution and attentional strategies. The procedure forces the student to use verbal mediation for which they have the capacity but perhaps not the practice or motivation to do so. Self-instruction training can

be employed by the teacher in the typical classroom and can be reinforced with the use of video-tape feedback to the student in the same manner video recordings were used in the present study. The power of video-tape feedback as a means for letting students see themselves as perhaps never before and as a means for triggering introspective comments about one's self (i.e. mediational activity) was very apparent in this study. The utility of video-tape feedback for such purposes has been noted in a host of other contexts (see Hung and Rosenthal, 1978) and invites further exploration as a tool for modifying cognitive impulsivity among inmates.

Reflection on Instrumental Enrichment and University of Victoria Programs. The issue of the modification of dysfunctional behaviour is, of course, at the heart of rehabilitation. Extrapolations from this study may serve to enhance understanding of two other approaches to rehabilitation currently receiving attention in Canada and elsewhere. The Instrumental Enrichment Program (Feuerstein, 1980) attempts to remediate deficiencies in cognitive processing by training the student on what are essentially non-verbal tasks. The hypothesis is that successful performance on these tasks will transfer to complex social and verbal contexts. Effectiveness studies of this approach have demonstrated difficulties with transfer (Narrol, Silverman and Waksman, undated). If the results reported in this study are generalizable, one reason for the lack of transfer is reflected by the apparent absence of convergent validity between highly inferential psychometric measures and observations of typical

behaviour in natural settings. The requirements of the non-verbal tasks used in IEP may not be sufficiently task-specific or valid to relate in any meaningful way to a person's everyday ability to cope with complex cognitive problems. The results of this study suggest that training should occur in ecologically valid contexts - in the classroom with a low inference and task-specific curriculum.

A second approach to rehabilitation through education of current interest also takes a cognitive deficit point of view towards the student. Modification, however, is imparted through the power of a carefully selected curriculum in the humanities and social sciences. The University of Victoria Program attempts to promote cognitive and moral development using the liberal arts and school community as vehicles (Ayers, Duguid and Montague, 1980). Two sorts of goals are anticipated for students: the development of alternative points of view through "de-centering", and the development of a greater understanding of society and the individual's role. It can be argued that the first goal is essentially a reduction in cognitive impulsivity. That is to say, students are encouraged to generate alternative hypotheses to explain events or to predict consequences rather than jump at the first available or most obvious conclusion. If reflective thought is regarded as a requisite for moral reasoning, the effectiveness of such programs might well be enhanced by the explicit integration of self-instructional training procedures.

## Recommendations

1. If it is the goal of penitentiary schools to address the highly salient individual difference of impulsivity characteristic of many inmate students, it is recommended that teacher observation instruments be developed and favoured over highly inferential psychometric tests for purposes of identification. The observation instruments developed for this study offer a starting point. It is suggested that they be further developed using a larger sample of teachers and students.
2. The literature suggests a number of means for accommodating the impulsive student so that learning effectiveness need not be impaired. It is recommended that a penitentiary school program be developed which will make accommodating provision for the highly impulsive student: e.g. a teacher-centered, structured curriculum characterized by short objectives, small classes, minimum distractions and success, and that this program (which ought to include a teacher training component) be evaluated for its effectiveness.
3. Impulsivity ought not to be continually accommodated in a school program. The eventual goal is to develop a more reflective style. Therefore, it is recommended that, as part of the program described above, a strategy be introduced with the aim of reducing cognitive impulsivity. Self-instruction training based on video-tape feedback has the potential for providing a particularly powerful strategy for the adolescent and adult and ought to be experimentally evaluated.

These recommendations are not intended to undermine the intuitions teachers have when they deal with differences among their students. By most accounts, teachers can be good at it. But like all of us, teachers too have biases and other perceptual screens which may limit rational and consistent action. The force of these recommendations is to deal in a consistent and systematic fashion with what is likely a pervasive and dysfunctional characteristic of many inmate students, and to attempt to replace whimsey with something approaching fact. Again, Suppes (1973) can be called upon to make a point emphatic:

We do not need to perform an experiment or take systematic observations in order to hold the firm factual belief that the sun will rise tomorrow. On the other hand, when we turn to the formulation of general principles or general ideas about human conduct and how that conduct might be changed by the process of education, we must forever be wary and skeptical of those who promise much in general terms and give us principles unsupported by evidence...One of the most sobering facts I know is that one of the earliest English charities was organized to collect money to buy wood to burn witches. The record of human folly committed in the name of morality or truth is too long and dismal to survey here (p7).

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## APPENDICES

### Appendix A

Consent forms for Collins Bay and Prison for Women

Consent Form

Prison for Women

I understand that the "styles of learning" study in which I am participating is being conducted solely for the purposes of contributing to the development of more effective teaching methods for adult students in penitentiary settings. This research is fully approved by the Department of Education and Training within the Correctional Services Ministry.

I understand that I will be videotaped during my involvement in the psychology course. Further, I understand that I will be interviewed by Ron Davis (Research Psychologist) and this interview will be recorded on audiotape. Only the research team will have access to these tapes, which will be destroyed upon completion of the study -- no later than December 31, 1980.

I am aware that my participation is strictly voluntary and I therefore have the right to withdraw from the study at any point. Furthermore, I have the right to withdraw any information concerning my participation (i.e., video and audio tapes, questionnaires) during, or following completion of the study. I understand that if I am dissatisfied with any aspect of the study or the researcher involved, I may freely express my feelings to Mr. Jack Watt, Assistant Director of Education and Training at the Prison for Women.

NAME: \_\_\_\_\_

DATE: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

Consent Form

Collins Bay

I understand that the "styles of learning" study in which I am participating is being conducted solely for the purposes of contributing to the development of more effective teaching methods for adult students in penitentiary settings. This research is fully approved by the Department of Education and Training within the Correctional Services Ministry.

I understand that I will be videotaped during my involvement in the Writing Skills course given by Mr. Lars Thompson. Further, I understand that I will be interviewed by Ron Davis (Research Psychologist) and this interview will be recorded on audiotape. Only the research team will have access to these tapes, which will be destroyed upon completion of the study - - no later than December 31, 1980.

I am aware that my participation is strictly voluntary and I therefore have the right to withdraw from the study at any point. Furthermore, I have the right to withdraw any information concerning my participation (i.e., video and audio tapes, questionnaires) during, or following completion of the study. I understand that if I am dissatisfied with any aspect of the study or the researcher involved, I may freely express my feelings to Mr. Jack Holder, Director of Education and Training at Collins Bay Institution.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_



## Appendix B

Student's assignment from writing skills course  
conducted at Collins Bay

## My Little Room

I think that my room is unique. It has a character and charm of its own and which in many ways, reflects my own personality.

It is not a very large room, barely twelve feet square, but its four embracing walls contain all my worldly possessions. Against the wall directly opposite the entry sits my much-used bed-chesterfield. It is an old plaid covered affair dressed in a tweed-like fabric of faded russet, yellow and gold squares. By day its my thinking seat, my lounging set, or my entertainment suite. By night its my warm bed, my magic carpet to dreamland and, sometimes, an all too small love nest.

Beside the chesterfield stands a large, awkward hexagonal walnut side table, slightly scarred and scratched, but very useable. A pair of small doors at its base conceal my precious collection of record albums with their silent songs in cardboard cloaks, accompanied by an assortment of books, magazines and record-cleaning paraphernalia. Atop the scarred side table sits a yellow ceramic lamp, its base chipped and cracked (purchased from the Salvation Army during leaner times for two dollars). Its dingy shade has now faded to a lack-lustre brown from what must once have been a rich amber; but its dim light casts a warm soft glow throughout the room.

From under the chesterfield and side table protrudes an imitation Persian rug that conceals a cold linoleum floor (not to mention a dormant cloud of dust). The rug lies off-center to the room, four heavy legs from a massive oak coffee table crushing its varicoloured fibres - a lasting impression, no doubt.

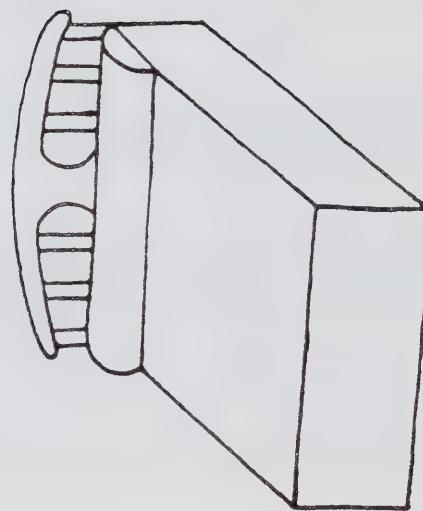
A small but very intriguing and colourful abstract in oils hangs precariously on one wall, like a one-eyed giant staring incessantly, inquisitively at my domain. On a bright corner, under the one lonely window, rests a solitary wicker-backed chair - another outcast relic from ages past - simple, frail-looking and incongruous. All who visit my humble room positively refuse to sit upon my wicker-backed chair for fear of contributing to its sudden demise. I must confess, it is rather rickety, though still able to support any average adult.

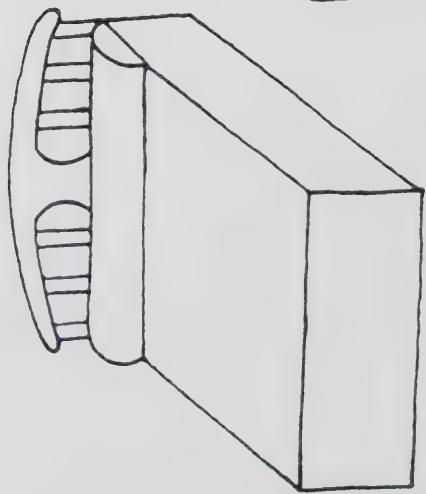
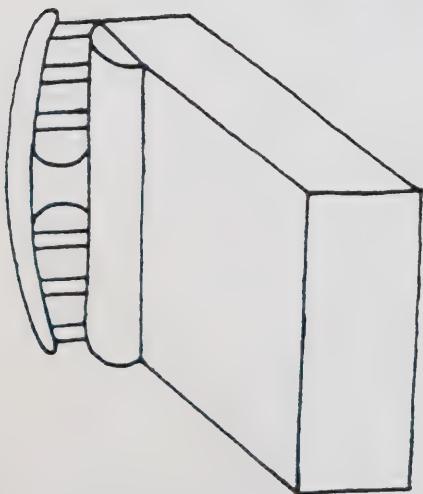
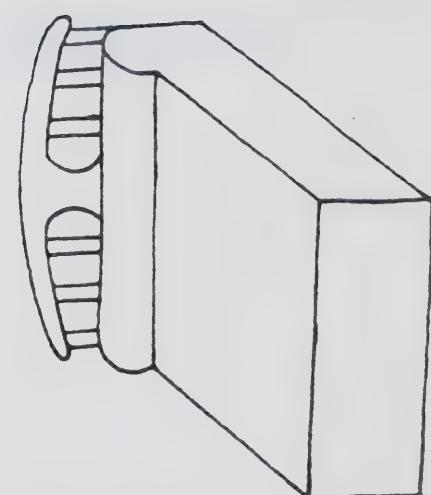
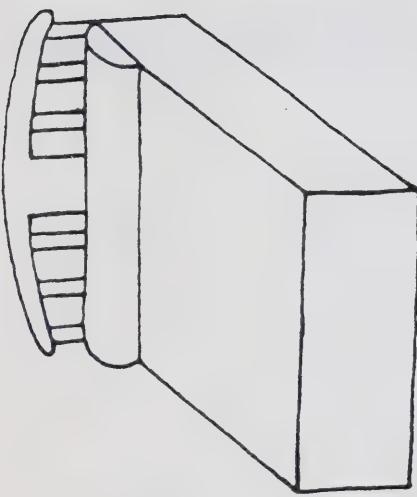
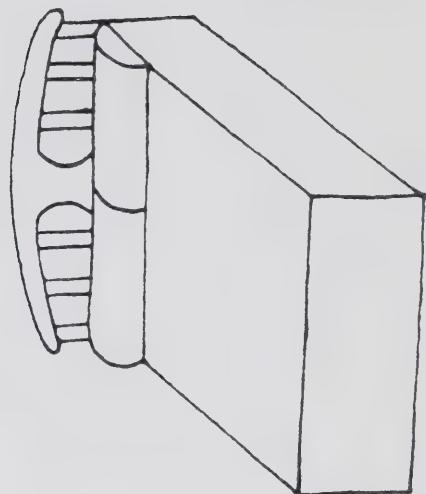
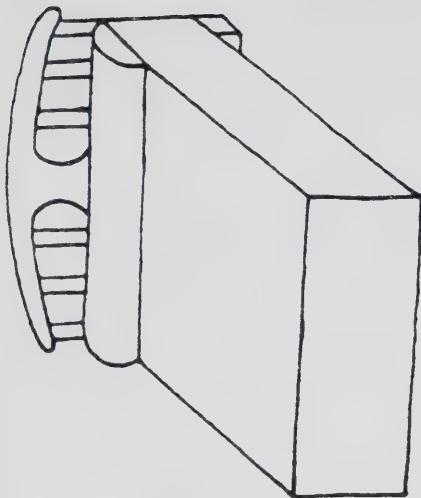
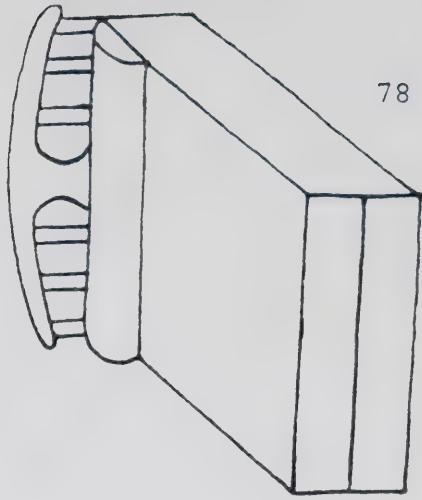
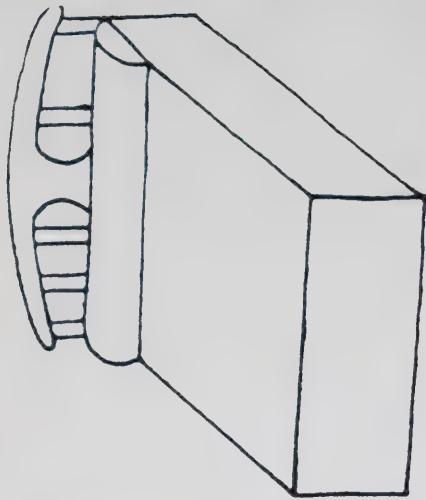
Next to my "antique" chair stands my pride and joy, an exceptionally well-preserved roll-top mahogany desk. Very functional. This beautiful and stately writing station is the central feature of my room, its focal point, the nucleus of my literary inspirations. Its spacious top is covered in layers of typed sheets, crumpled efforts, books, magazines, ash trays spilling butts, an empty coffee mug (or two?), and a half-eaten doughnut - all giving evidence of a long night's literary campaign.

You see, I am a writer.

## Appendix C

Sample from the Matching Familiar Figures Test - Adult (MFFT): Sample shows stimulus figure and eight choices for matching.







## Appendix D

Sample item from the Group Embedded Figures Test



## Appendix E

Description of the test for Conceptual Level: Paragraph Completion Method

On the following pages you will be asked to give your ideas about several topics. Try to write at least three sentences on each topic.

There are no right or wrong answers, so give your own ideas and opinions about each topic. Indicate the way you really feel about each topic, not the way others feel or the way you think you should feel.

The topics, each on a separate page are:

1. What I think about rules...
2. When I am criticized...
3. What I think about parents...
4. When someone does not agree with me...
5. When I am not sure...
6. When I am told what to do...

You will have about 3 minutes for each page.

Please wait for the signal to go to a new page.

## Appendix F

Sample of items from the Test of Attentional and Interpersonal Style. Twenty six of a total of 144 items are shown.

# TEST OF ATTENTIONAL AND INTERPERSONAL STYLE

Robert M. Nideffer, Ph.D.

## INSTRUCTIONS

**USE NO. 2 PENCIL      DO NOT WRITE ON THE TEST BOOKLET**

Read each item carefully and then answer according to the frequency with which it describes you or your behavior. For example, item 1 is "When people talk to me, I find myself distracted by the sights and sounds around me."

A = NEVER  
B = RARELY  
C = SOMETIMES  
D = FREQUENTLY  
E = ALWAYS

If your answer to the first item is SOMETIMES, you would mark with a No. 2 pencil under C for item number 1. The same key is used for every item, thus each time you mark an A you are indicating NEVER, etc.

1. Please be sure to mark your name in the spaces provided at the right of the answer sheet.
2. Fill in your date of birth in the spaces provided at the bottom of the answer sheet.
3. Indicate your sex in the space provided.
4. At the bottom of the answer sheet under Grade, please indicate the number of years of schooling you have completed.

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*Behavioral Research Applications Group, Inc.*

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ROCHESTER, NEW YORK 14607                KITCHENER, ONTARIO

1. When people talk to me I find myself distracted by the sights and sounds around me.
2. When people talk to me I find myself distracted by my own thoughts and ideas.
3. All I need is a little information and I can come up with a large number of ideas.
4. My thoughts are limited to the objects and people in my immediate surroundings.
5. I need to have all the information before I say or do anything.
6. The work I do is focused and narrow, proceeding in a logical fashion.
7. I run back and forth from task to task.
8. I seem to work in "fits and starts" or "bits and pieces".
9. The work I do involves a wide variety of seemingly unrelated material and ideas.
10. My thoughts and associations come so rapidly I can't keep up with them.
11. The world seems to be a booming buzzing brilliant flash of color and confusion.
12. When I make a mistake it is because I did not wait to get all of the information.
13. When I make a mistake it is because I waited too long and got too much information.
14. When I read it is easy to block out everything but the book.
15. I focus on one small part of what a person says and miss the total message.
16. In school I failed to wait for the teachers' instructions.
17. I have difficulty clearing my mind of a single thought or idea.
18. I think about one thing at a time.
19. I get caught up in my thoughts and become oblivious to what is going on around me.
20. I theorize and philosophize.
21. I enjoy quiet, thoughtful times.
22. I would rather be feeling and experiencing the world than my own thoughts.
23. My environment is exciting and keeps me involved.
24. My interests are broader than most people's.
25. My interests are narrower than most people's.
26. It is easy for me to direct my attention and focus narrowly on something.



## Appendix G

Description of the four cognitive style constructs supplied to the judges.

REFLECTION-IMPULSIVITYIMPULSIVE — REFLECTIVE

- when presented with a number of response alternatives, the individual's exploratory behaviour is so disorganized that he/she is unable to select those alternatives whose specific attributes make them relevant for a proper solution.
- limited awareness of the need for additional data to produce the proper answer.
- responds rapidly to the first and most salient stimulus before he/she has had an opportunity to gather all of the data available to him/her, often resulting in incorrect responses (trial-and-error responding)
- often interrupts teacher in the process of giving instructions and therefore fails to fully perceive instructions.
- offers absurd, erroneous answers to questions when he/she is fully capable of giving a correct response.
- tends to break promises
- has difficulty setting future-oriented goals.
- finds it difficult to settle down to work.
- disrupts classroom or group activities.
- interrupts others who are involved in discussion.
- frustrated with assignments and other school activities.

- when presented with a number of response alternatives, the individual will thoroughly explore and evaluate each in terms of their relevance to a proper solution.
- is aware when there is not enough data to produce a proper answer.
- will gather all of the data and evaluate it before responding.
- makes sure that he/she fully understands the instructions given by the teacher.
- produces thoughtful and detailed answers.
- keeps promises.
- sets future oriented-goals.
- is capable of settling down to work.

## FIELD-DEPENDENCE/INDEPENDENCE

<u>FIELD-DEPENDENT</u>	<u>FIELD-INDEPENDENT</u>
<ul style="list-style-type: none"><li>-adheres to the organization of the field as given.</li><li>-leaves the material "as is" without classifying <b>or</b> structuring it.</li><li>-prefers to be physically close to others; likes to work with others.</li><li>-depends on others (teachers and students) for directions and explanations.</li><li>-models own behaviour on the behaviour of others.</li><li>-is attentive to and makes use of <b>prevailing</b> social frames of reference in defining their attitudes and feelings.</li><li>-in terms of occupational preference, favours educational-vocational areas in which the subject matter of the discipline features human content.</li><li>-more likely to require externally defined goals and reinforcement.</li><li>- more affected by criticism.</li></ul>	<ul style="list-style-type: none"><li>-likely to overcome the organization of the field, or to restructure it, when presented with a field having dominant organization.</li><li>-imposes structure spontaneously on stimulus material which lacks it.</li><li>-not sensitive to social undercurrents.</li><li>-has an impersonal orientation and prefers to work independently.</li><li>-possesses self-defined goals and reinforcements.</li><li>-learns better under conditions of intrinsic motivation.</li><li>-in terms of occupational preference, favours areas that are more solitary in their work requirements and more abstract in their substantive content.</li><li>-relatively unaffected by criticism.</li></ul>

CONCEPTUAL LEVEL

LOW ————— HIGH

- has a low level of conceptual complexity and interpersonal maturity. For example, when asked what he/she thinks about "rules", typical responses would be:
  - "I hate rules. I never obey them. Me and my friends criticize them."
  - "I don't like them. Rules are made to break. I feel they are also made to get you in trouble."
- is conventional, as opposed to original, in his/her expression of ideas.
- learns best in, and prefers, a structured learning environment like a lecture approach.

- dependent on external standards and incapable of generating own concepts.

- seeks out concrete examples and ideas rather than abstract and theoretical ones.
- behaves immaturely in his/her relations with others.

- has a high level of conceptual complexity and interpersonal maturity. For example, when asked what he/she thinks about "rules", typical responses would be:
  - "Rules, if they are not too restrictive of my abilities to make my own judgements when the situation warrants it, are okay. However, I don't need rules for every detail of my life."
- "Rules are a necessity in a complex society such as ours. However, rules cannot be applied in the same manner for all circumstances. A change in circumstance could make a difference in how much or how strictly the rules should be adhered to."

- capable of responsible action and able to adapt to a changing environment.
- capable of generating new concepts and holding internal standards.
- profits more from, and prefers, a low structured learning environment like a discovery approach.

- is original, as opposed to conventional, in his/her expression of ideas.

### ATTENTIONAL FOCUS

POOR

-make mistakes due to being confused and overloaded by environmental information.

-becomes confused when many things are happening at the same time.

-when engaged in conversation, they are distracted by irrelevant sights and sounds.

-difficulty in thinking or concentrating on one thing for any length of time.

-can't make up mind when faced with a number of choices.

-happenings or objects "grab" their attention.

-works in "fits and starts" or "bits and pieces".

-unable to share attention and focus on a number of things at the same time.

-appears inattentive, as if daydreaming.

GOOD

-able to effectively integrate many environmental stimuli at one time.

-good at quickly analyzing complex situations in the environment.

-able to focus attention and concentrate on one task (e.g., reading a book).

-in a room filled with people, the person knows what everyone is doing.

-good at rapidly scanning the environment and picking out an important object.

-can plan several moves ahead in a complicated game like chess.

-able to share attention and focus on a number of things at the same time.

-finds it easy to bring together ideas and facts from a number of different sources.

-is attentive to all important sources of information at all times.



## Appendix H

### Judges' rating scales

NAME OF RATER \_\_\_\_\_ DATE \_\_\_\_\_

NUMBER AND INITIALS OF SUBJECT BEING RATED \_\_\_\_\_

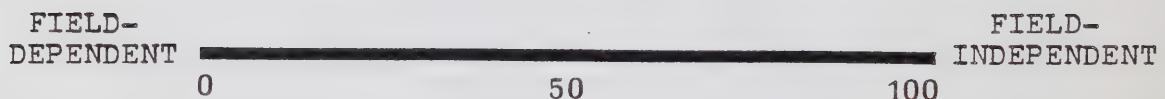
REFLECTION-IMPULSIVITY



Briefly describe those cues which influenced your rating of this subject:

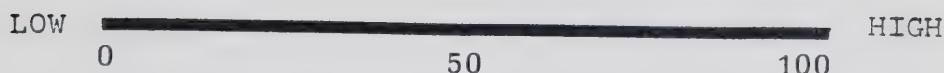
What percentage of your rating of this subject was based on the interview?

FIELD-DEPENDENCE/INDEPENDENCE



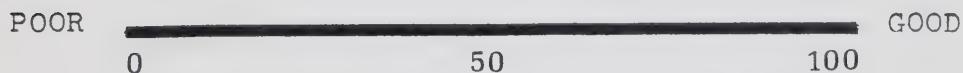
Briefly describe those cues which influenced your rating of this subject:

What percentage of your rating of this subject was based on the interview?

CONCEPTUAL LEVEL

Briefly describe those cues which influenced your rating of this subject:

What percentage of your rating of this subject was based on the interview?

ATTENTIONAL FOCUS

Briefly describe those cues which influenced your rating of this subject:

What percentage of your rating of this subject was based on the interview?



## Appendix I

Observer's Behaviour Codes

and

Intercorrelations of observer measures  
and judges' measures

Observer's Behaviour Codes

<u>Construct</u>	<u>Codes</u>	<u>Variable Name</u>
Reflection- impulsivity	Responds rapidly	RR (RIMP)
	Divergent verbal	DV (RIMP)
	Divergent non-verbal	DNV (RIMP)
Field dependence- independence	Seeks guidance/ reassurance	SG (FDI)
	Easy to agree	A (FDI)
Conceptual level	Seeks concrete referents	(omitted)
	Avoid formulation	AF (CL)
Attentional focus	Distracted by environment	DE (AF)
	Distracted by self	DS (AF)

Intercorrelations of observer measures

and judges' measures

	JRIMP	JFDI	JCL	JAF	RR (RIMP)	DV (RIMP)	DNV (RIMP)	SG (FDI)	A (FDI)	AF (CL)	DE (AF)	DS (AF)
JRIMP												
JFDI		.34										
JCL		.67 **	*									
JAF		.75 ***	.37									
RR (RIMP)		-.19	.57 *									
DV (RIMP)		-.20	.75 ***									
DNV (RIMP)		-.09	.14									
SG (FDI)		-.23	.21									
A (FDI)		.14	-.09									
AF (CL)		-.52 *	-.63									
DE (AF)		-.17	.18									
DS (AF)		-.24	.67 **									

Note. Correlations are Spearman Rank-Correlation Coefficients.

\* $p < .05$     \*\* $p < .01$     \*\*\* $p < .005$     \*\*\*\* $p < .001$



## Appendix J

### Teacher Rating Scale

NAME OF RATER \_\_\_\_\_

Read each item carefully and then rate each student on that item according to the frequency with which it describes his/her behaviour. For example, item 1 is "Does the student depend on others (students and teacher) for directions and explanations."

0 = RARELY OR NEVER

1 = SOMETIMES

2 = FREQUENTLY OR ALWAYS

X = CAN'T SAY

If your impression of the student is RARELY OR NEVER, you would place a "0" in the column directly under that student's name. If you are not familiar enough with the student to make a reasonably accurate rating, then mark the column with a "X" (CAN'T SAY).

Try to rate each student in relation to all other students listed for each particular item as this will increase the accuracy of your ratings.

0 = RARELY OR NEVER  
1 = SOMETIMES  
2 = FREQUENTLY OR ALWAYS  
X = CAN'T SAY

99

0 = RARELY OR NEVER  
1 = SOMETIMES  
2 = FREQUENTLY OR ALWAYS  
X = CAN'T SAY

100

12. Does the student have difficulty setting future oriented goals?
13. Does the student have difficulty following instructions?
14. Does the student have difficulty settling down to work?
15. Does the student disrupt classroom or group activities?
16. Does the student interrupt others in discussion or activities?
17. Does the student appear frustrated with assignments and other school activities?
18. Does the student work or reply to a question too quickly and make errors as a result?  
(LEAVE BLANK)
19. Does the student have difficulty completing assignments and jump from one to another as a result?
20. Does the student have to be reminded of responsibilities or assignments?
21. Does the student appear to be easily distracted?
22. Does the student appear to be easily confused when there is a lot going on?
23. Does the student appear inattentive, as if he/she is daydreaming?  
(LEAVE BLANK)

### Appendix K

Means, standard deviations and correlations  
for primary variables

<u>Variable</u>	<u>Description</u>	<u><math>\bar{X}</math></u>	<u>s.d.</u>
EDUC	Education level by grade	11.00	2.22
SIT	Slossen Intelligence Test I.Q.	121.55	16.42
LATNC	Latency score on Matching Familiar Figures Test (MFFT)	52.33	22.72
PRIMP	Error score on MFFT	7.50	5.62
PCL	Conceptual Level score on paragraph completion	1.98	0.44
PFDI	Score on Group Embedded Figures Test	12.83	5.04
PAF	OFT subscale score on Test of Attentional and Interpersonal Style (TAIS)	17.58	5.38
PBCON	BCON subscale score on TAIS	21.42	4.58
JRIMP	Judges' rating of reflection-impulsivity	59.13	14.92
JFDI	Judges' rating of field dependence-independence	52.40	8.88
JCL	Judges' rating of conceptual level	60.08	11.21
JAF	Judges' rating of attentional focus	60.03	12.53
TRIMP	Teachers' rating of reflection-impulsivity	3.03	1.85
TFDI	Teachers' rating of field dependence-independence	4.08	0.90
TCL	Teachers' rating of conceptual level	3.23	1.30
TAF	Teachers' rating of attentional focus	2.04	1.73
ORIMP	Observer's rating of reflection-impulsivity	*	0.75
OFDI	Observer's rating of field dependence-independence	*	0.62
OCL	Observer's rating of conceptual level	*	1.00
OAF	Observer's rating of attentional focus	*	0.87

\* Scores reported in  $z$  scores,  $\bar{X} = 0$ .

FILE NONAME (CREATION DATE = 02/26/81)

## ----- SPEARMAN CORRELATION COEFFICIENTS -----

VARIABLE PAIR											
EDUC	0.4350	EDUC	0.5134	EDUC	-0.5990	EDUC	0.3423	EDUC	0.4697	EDUC	-0.5922
WITH	N( 11)	WITH	N( 12)								
SIT	SIG .091	LATNC	SIG .044	PRIMP	SIG .020	PCL	SIG .138	PFDI	SIG .062	PAF	SIG .021
EDUC	-0.5489	EDUC	0.2523	EDUC	0.4876	EDUC	0.6040	EDUC	0.2523	EDUC	-0.0975
WITH	N( 12)	WITH	N( 11)								
PBCON	SIG .032	JRIMP	SIG .214	JFDI	SIG .054	JCL	SIG .019	JAF	SIG .214	TRIMP	SIG .388
EDUC	0.3328	EDUC	-0.1263	EDUC	-0.0249	EDUC	0.1990	EDUC	-0.1691	EDUC	-0.4480
WITH	N( 12)	WITH	N( 12)	WITH	N( 10)	WITH	N( 12)	WITH	N( 12)	WITH	N( 12)
TFDI	SIG .145	TCL	SIG .348	TAF	SIG .473	ORIMP	SIG .268	OFDI	SIG .300	OCL	SIG .072
EDUC	0.3446	SIT	0.1007	SIT	-0.4703	SIT	-0.0708	SIT	0.7574	SIT	0.1724
WITH	N( 12)	WITH	N( 11)								
OAF	SIG .136	LATNC	SIG .384	PRIMP	SIG .072	PCL	SIG .418	PFDI	SIG .003	PAF	SIG .306
SIT	0.2244	SIT	0.7016	SIT	0.4292	SIT	0.6014	SIT	0.3781	SIT	-0.3343
WITH	N( 11)	WITH	N( 10)								
PBCON	SIG .254	JRIMP	SIG .008	JFDI	SIG .094	JCL	SIG .025	JAF	SIG .126	TRIMP	SIG .173
SIT	-0.1416	SIT	-0.1484	SIT	-0.1097	SIT	-0.1185	SIT	0.0571	SIT	-0.5789
WITH	N( 11)	WITH	N( 11)	WITH	N( 9)	WITH	N( 11)	WITH	N( 11)	WITH	N( 11)
TFDI	SIG .339	TCL	SIG .332	TAF	SIG .389	ORIMP	SIG .364	OFDI	SIG .434	OCL	SIG .031
SIT	-0.1640	LATNC	-0.5845	LATNC	0.4377	LATNC	0.2857	LATNC	-0.3481	LATNC	-0.0555
WITH	N( 11)	WITH	N( 12)								
OAF	SIG .315	PRIMP	SIG .023	PCL	SIG .054	PFDI	SIG .184	PAF	SIG .134	PBCON	SIG .432
LATNC	0.1754	LATNC	-0.0387	LATNC	0.2491	LATNC	0.1368	LATNC	-0.2096	LATNC	0.2496
WITH	N( 12)	WITH	N( 11)	WITH	N( 12)						
JRIMP	SIG .293	JFDI	SIG .453	JCL	SIG .217	JAF	SIG .336	TRIMP	SIG .268	TFDI	SIG .217

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FILE NONAME (CREATION DATE = 02/26/81)

## ----- SPEARMAN CORRELATION COEFFICIENTS -----

VARIABLE PAIR	VARIABLE PAIR	VARIABLE PAIR	VARIABLE PAIR	VARIABLE PAIR	VARIABLE PAIR						
JFDI WITH OAF	0.4028 N(. 12) SIG .097	JCL WITH JAF	0.7692 N(. 12) SIG .002	JCL WITH TRIMP	-0.5818 N(. 11) SIG .030	JCL WITH TFDI	0.0070 N(. 12) SIG .491	JCL WITH TCL	-0.3047 N(. 12) SIG .168	JCL WITH TAF	-0.5627 N(. 10) SIG .045
JCL WITH ORIMP	0.0490 N(. 12) SIG .440	JCL WITH OFDI	-0.4623 N(. 12) SIG .065	JCL WITH OCL	-0.7443 N(. 12) SIG .003	JCL WITH OAF	-0.2168 N(. 12) SIG .249	JAF WITH TRIMP	-0.4455 N(. 11) SIG .085	JAF WITH TFDI	-0.1296 N(. 12) SIG .344
JAF WITH TCL	-0.1681 N(. 12) SIG .301	JAF WITH TAF	-0.3486 N(. 10) SIG .162	JAF WITH ORIMP	0.0559 N(. 12) SIG .431	JAF WITH OFDI	-0.2732 N(. 12) SIG .195	JAF WITH OCL	-0.5820 N(. 12) SIG .024	JAF WITH OAF	-0.4476 N(. 12) SIG .072
TRIMP WITH TFDI	0.3007 N(. 11) SIG .184	TRIMP WITH TCL	0.4647 N(. 11) SIG .075	TRIMP WITH TAF	0.6667 N(. 10) SIG .018	TRIMP WITH ORIMP	0.5091 N(. 11) SIG .055	TRIMP WITH OFDI	0.3052 N(. 11) SIG .181	TRIMP WITH OCL	0.2575 N(. 11) SIG .222
TRIMP WITH OAF	0.1545 N(. 11) SIG .325	TFDI WITH TCL	0.0333 N(. 12) SIG .459	TFDI WITH TAF	0.2147 N(. 10) SIG .276	TFDI WITH ORIMP	0.4028 N(. 12) SIG .097	TFDI WITH OFDI	-0.3351 N(. 12) SIG .144	TFDI WITH OCL	-0.1784 N(. 12) SIG .289
TFDI WITH OAF	-0.0070 N(. 12) SIG .491	TCL WITH TAF	0.2997 N(. 10) SIG .200	TCL WITH ORIMP	0.1821 N(. 12) SIG .286	TCL WITH OFDI	0.5421 N(. 12) SIG .034	TCL WITH OCL	0.4753 N(. 12) SIG .059	TCL WITH OAF	-0.0771 N(. 12) SIG .406
TAF WITH ORIMP	0.3364 N(. 10) SIG .171	TAF WITH OFDI	0.2730 N(. 10) SIG .223	TAF WITH OCL	0.2415 N(. 10) SIG .251	TAF WITH OAF	0.0306 N(. 10) SIG .467	ORIMP WITH OFDI	0.0736 N(. 12) SIG .410	ORIMP WITH OCL	-0.3563 N(. 12) SIG .128
ORIMP WITH OAF	0.3846 N(. 12) SIG .109	OFDI WITH OCL	0.4523 N(. 12) SIG .070	OFDI WITH OAF	0.3713 N(. 12) SIG .117	OCL WITH OAF	0.1623 N(. 12) SIG .307				

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FILE NONAME (CREATION DATE = 02/26/81)

## ----- SPEARMAN CORRELATION COEFFICIENTS -----

VARIABLE PAIR											
PFDI	-0.1285	PFDI	-0.4096	PFDI	-0.0562	PAF	0.7595	PAF	-0.0634	PAF	-0.2363
WITH	N( 12)										
OFDI	SIG .345	OCL	SIG .093	OAF	SIG .431	PBCON	SIG .002	JRIMP	SIG .422	JFDI	SIG .230
PAF	-0.4155	PAF	-0.2430	PAF	0.0595	PAF	-0.2487	PAF	0.0547	PAF	-0.1538
WITH	N( 12)	WITH	N( 12)	WITH	N( 11)	WITH	N( 12)	WITH	N( 12)	WITH	N( 10)
JCL	SIG .090	JAF	SIG .223	TRIMP	SIG .431	TFDI	SIG .218	TCL	SIG .433	TAF	SIG .336
PAF	-0.3592	PAF	0.4815	PAF	0.4476	PAF	-0.0916	PBCON	-0.0820	PBCON	-0.3840
WITH	N( 12)										
ORIMP	SIG .126	OFDI	SIG .056	OCL	SIG .072	OAF	SIG .389	JRIMP	SIG .400	JFDI	SIG .109
PBCON	-0.4707	PBCON	-0.2532	PBCON	0.2023	PBCON	-0.4715	PBCON	0.5447	PBCON	0.0901
WITH	N( 12)	WITH	N( 12)	WITH	N( 11)	WITH	N( 12)	WITH	N( 12)	WITH	N( 10)
JCL	SIG .061	JAF	SIG .214	TRIMP	SIG .275	TFDI	SIG .061	TCL	SIG .034	TAF	SIG .402
PBCON	-0.2817	PBCON	0.7608	PBCON	0.5270	PBCON	-0.1248	JRIMP	0.3398	JRIMP	0.6713
WITH	N( 12)										
ORIMP	SIG .188	OFDI	SIG .002	OCL	SIG .039	OAF	SIG .350	JFDI	SIG .140	JCL	SIG .008
JRIMP	0.7483	JRIMP	-0.8182	JRIMP	-0.2872	JRIMP	-0.3713	JRIMP	-0.5077	JRIMP	-0.2168
WITH	N( 12)	WITH	N( 11)	WITH	N( 12)	WITH	N( 12)	WITH	N( 10)	WITH	N( 12)
JAF	SIG .003	TRIMP	SIG .001	TFDI	SIG .183	TCL	SIG .117	TAF	SIG .067	ORIMP	SIG .249
JRIMP	-0.1541	JRIMP	-0.5150	JRIMP	-0.2797	JFDI	0.5394	JFDI	0.3713	JFDI	-0.1093
WITH	N( 12)	WITH	N( 11)								
OFDI	SIG .316	OCL	SIG .043	OAF	SIG .189	JCL	SIG .035	JAF	SIG .117	TRIMP	SIG .374
JFDI	0.2070	JFDI	-0.2772	JFDI	-0.1166	JFDI	0.7110	JFDI	-0.0807	JFDI	-0.6290
WITH	N( 12)	WITH	N( 12)	WITH	N( 10)	WITH	N( 12)	WITH	N( 12)	WITH	N( 12)
TFDI	SIG .259	TCL	SIG .192	TAF	SIG .374	ORIMP	SIG .005	OFDI	SIG .402	OCL	SIG .014

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FILE NONAME (CREATION DATE = 02/26/81)

SPEARMAN CORRELATION COEFFICIENTS											
VARIABLE PAIR		VARIABLE PAIR		VARIABLE PAIR		VARIABLE PAIR		VARIABLE PAIR		VARIABLE PAIR	
LATNC	0.4341	LATNC	-0.3006	LATNC	-0.0035	LATNC	0.1986	LATNC	-0.0230	LATNC	0.1123
WITH	N( 12)	WITH	N( 10)	WITH	N( 12)						
TCL	SIG .079	TAF	SIG .199	ORIMP	SIG .496	OFDI	SIG .268	OCL	SIG .472	OAF	SIG .364
PRIMP	-0.5968	PRIMP	-0.6702	PRIMP	0.6378	PRIMP	0.3042	PRIMP	-0.6386	PRIMP	-0.1002
WITH	N( 12)	WITH	N( 12)	WITH	N( 12)	WITH	N( 12)	WITH	N( 12)	WITH	N( 12)
PCL	SIG .020	PFDI	SIG .009	PAF	SIG .013	PBCON	SIG .168	JRIMP	SIG .013	JFDI	SIG .378
PRIMP	-0.5509	PRIMP	-0.4561	PRIMP	0.5023	PRIMP	0.0351	PRIMP	0.0246	PRIMP	0.0123
WITH	N( 12)	WITH	N( 12)	WITH	N( 11)	WITH	N( 12)	WITH	N( 12)	WITH	N( 10)
JCL	SIG .032	JAF	SIG .068	TRIMP	SIG .058	TFDI	SIG .457	TCL	SIG .470	TAF	SIG .487
PRIMP	0.1123	PRIMP	0.2162	PRIMP	0.4425	PRIMP	0.1579	PCL	0.1834	PCL	-0.5283
WITH	N( 12)	WITH	N( 12)	WITH	N( 12)	WITH	N( 12)	WITH	N( 12)	WITH	N( 12)
ORIMP	SIG .364	OFDI	SIG .250	OCL	SIG .075	OAF	SIG .312	PFDI	SIG .284	PAF	SIG .039
PCL	-0.3006	PCL	0.1193	PCL	-0.1740	PCL	0.1684	PCL	0.1228	PCL	-0.1781
WITH	N( 12)	WITH	N( 12)	WITH	N( 12)	WITH	N( 12)	WITH	N( 12)	WITH	N( 11)
PBCON	SIG .171	JRIMP	SIG .356	JFDI	SIG .294	JCL	SIG .300	JAF	SIG .352	TRIMP	SIG .300
PCL	0.4200	PCL	0.3216	PCL	0.3006	PCL	-0.0702	PCL	-0.3726	PCL	0.0850
WITH	N( 12)	WITH	N( 12)	WITH	N( 10)	WITH	N( 12)	WITH	N( 12)	WITH	N( 12)
TFDI	SIG .087	TCL	SIG .154	PAF	SIG .199	ORIMP	SIG .414	OFDI	SIG .116	OCL	SIG .396
PCL	-0.2982	FFDI	-0.1044	FFDI	-0.1344	FFDI	0.9244	FFDI	0.3609	FFDI	0.6995
WITH	N( 12)	WITH	N( 12)	WITH	N( 12)	WITH	N( 12)	WITH	N( 12)	WITH	N( 12)
OAF	SIG .173	PAF	SIG .373	PBCON	SIG .339	JRIMP	SIG .001	JFDI	SIG .125	JCL	SIG .006
PFDI	0.5765	PFDI	-0.8559	PFDI	-0.2588	PFDI	-0.3732	PFDI	-0.5216	PFDI	-0.2917
WITH	N( 12)	WITH	N( 11)	WITH	N( 12)	WITH	N( 12)	WITH	N( 10)	WITH	N( 12)
JAF	SIG .025	TRIMP	SIG .001	TFDI	SIG .208	TCL	SIG .116	TAF	SIG .061	ORIMP	SIG .179

A VALUE OF 99.0000 IS PRINTED IF A COEFFICIENT CANNOT BE COMPUTED.

